MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINES AND RECLAMATION BUREAU

ABANDONED HARDROCK MINE PRIORITY SITES

PROJECT REPORT

Deer Lodge County (Orofino District)
Through
Fergus County (Warm Springs District)

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Deer Lodge County			
	Orofino	Champion	PA # 12-003
	Silver Lake	Cable	PA # 12-002
		Gold Coin Mine	PA # 12-004
		Silver Lake Millsite	PA # 12-070
Fergus County			
	Warm Springs	Tail Holt	PA # 14-010
		Cumberland	PA # 14-017

DEER LODGE

OROFINO

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY SITE INVESTIGATION LOG SHEET

Mine/Site Name: CHAMPION **PA#:** 12-003

Date: July 16, 1993 **Time:** 0930

Field Team Leader: Bullock, Pioneer

Sampling Personnel: Flammang, Pioneer
Clark, Pioneer

Visitors: None

Weather/Seasonality Observations: Cloudy with sprinkles of rain on and off all day; breezy; cold (45°F); wet, cool spring and summer.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #29: GW-1 location, adit discharge; #30: WR-1, west side of dump; #31: WR-2, east side of dump; #32: Broken asbestos press board scattered around upper cement foundation; #33: Loadout; #34: TP-1A; #35: TP-1B, #37: TP-1C. Video Tape No. 4

General Comments/Observations (not covered specifically in attached Inventory Forms): N/A

Other Hazardous Materials/Substances Present: Asbestos press board is scattered around the upper cement foundation east of Adit #1; estimated amount is approx. 100 lbs.

General Comments on Potential Remedial Alternatives: Isolate tailings from drainage, amend, and revegetate. Reduce slopes of waste rock, amend, and revegetate.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): CHAMPION PA#: 12-003

Legal Description: T 6N ;R 8W ;Sec. 33 ,NE 1/4 NW1/4 ___1/4

County: DEERLODGE Mining District: OROFINO

Latitude: N 46° 13' 55" Longitude: W 112° 36' 40"

Primary Drainage Basin and Code: Orofino Creek/12010201
Secondary Drainage Basin: Orofino Creek

USGS Quadrangle map name(s): Lockhart Meadows

Mine Type/Commodities: Hardrock/Silver

Activity Status: Active___,Inactive/Exploration___,Abandoned X .

Ownership status: Known YX N__; private/public? Private/Public
Owner, Agent, or Contact(Include address and phone when available): Magellan Resources, Inc., #1305 - 1090 West Georgia Street, Vancouver, British Columbia, Canada V6E 3V7; P.O. Box 2005, Philipsburg, MT 59858; Deerlodge National Forest.

Relationship to other mines/sites in the area/district: Unknown

Regulatory Status (Activity by other agencies)? Hardrock permits? Past Reclamation Activities? Test plots of vegetation are present on the tailings.

General site features: Elevation 6480', Slope 10°-15° (Mill); 20° (Mine), Aspect Southwest

Land use: Mining___, Recreational X , Residential___, Urban___, Agricultural X , Other(Specify)

Area of disturbed/unvegetated lands? 2.5 acres.
Dimensions:

Predominant vegetation types: Lodgepole pine and aspen forest surrounding site; tailings have Lodgepole pine, aspen, spruce, willow, rush and other grasses; dumps have some aspen pioneering and strawberries.

Access: roads - good___,poor___,4wd X ,trail___.
Other logistical considerations (proximity to other sites).

Well logs within 1 mile radius; water rights 15 mi downstream (Attach MBMG Well Log Printout(s): There are no well logs within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). Site lies on the north side of an unnamed perennial tributary to Orofino Creek. The creek flows west along the site to its confluence with Orofino Creek approx. 1/3 mile below the site. Altered and unaltered quartz monzonite of the Butte quartz monzonite underlies the site. The deposit is described as a fissure deposit in the apalite phase of the Butte quartz monzonite.

Mining/milling history, ore type/tenor, host rock, gangue: Mine was first operated from 1886 to 1888. It reopened in 1920, and closed again in 1926. Ore body was a proustite/pyrargyrite bearing quartz vein in the apalite phase of the Butte quartz monzonite mineralization. 30,000 tons of flotation concentrate was shipped in 1923 and several hundred tons in 1920-23. Ore was associated with quartz and a small amount of sulfides, including ruby silver.

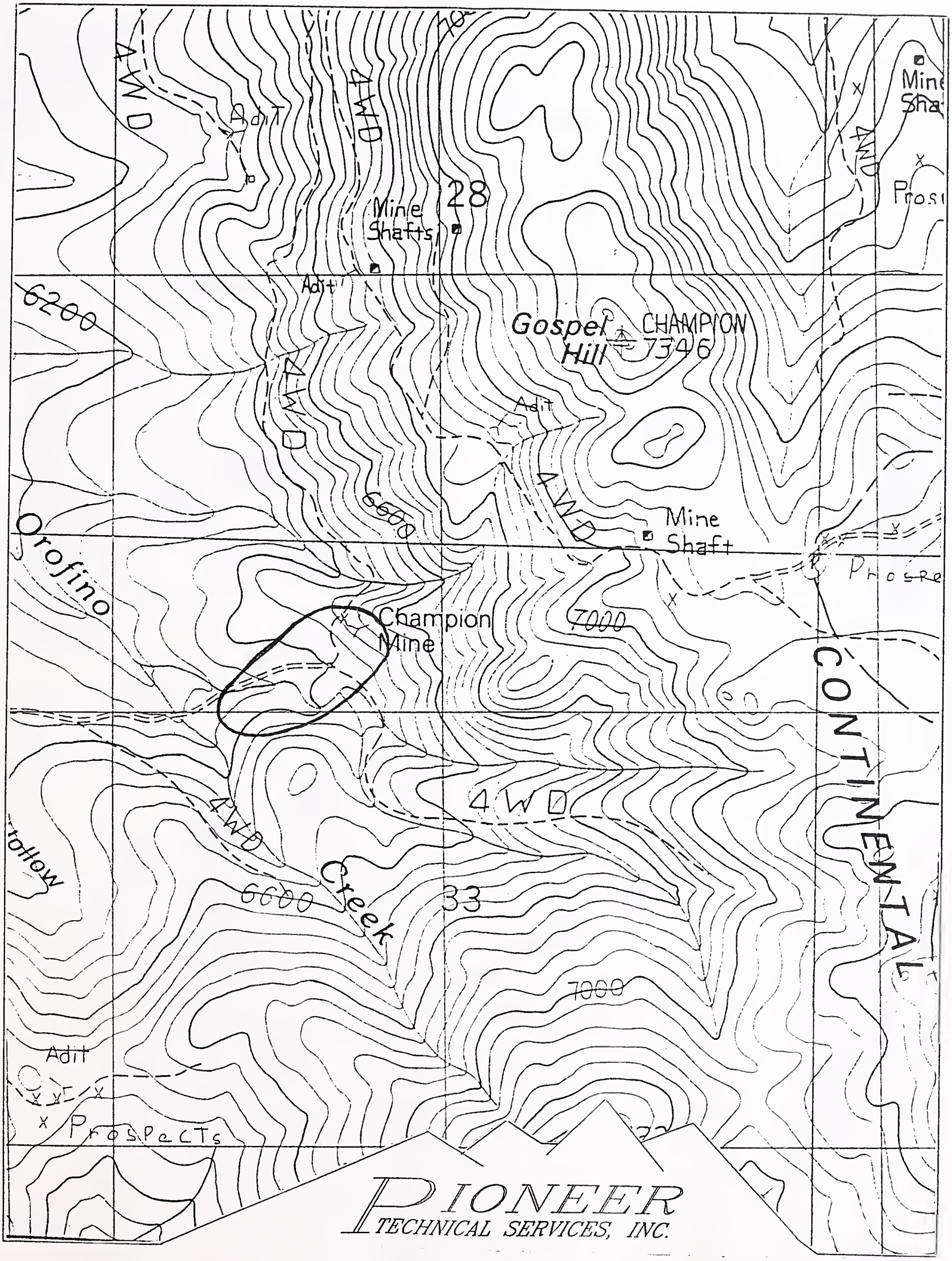
Mine Operation?
Shafts - Yes___, No_X_, # ____, Comment
Adits - Yes_X_, No___, # _1_, Comment Caved with water discharge
Pits - Yes___, No_X_, # ____, Comment
Placers - Yes___, No_X_, # ____, Comment
Other - Yes___, No_X_, # ____, Comment

Mill Operation? Yes_X_, No____. If yes answer the next three questions:

Period(s) of Operation: 1920 to 1926

Origin of Ore Milled - Custom Mill___ Dedicated Mill_X_; Number and names of mines that supplied mill feed: Champion mine

Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting?
Floatation concentrator mill for silver

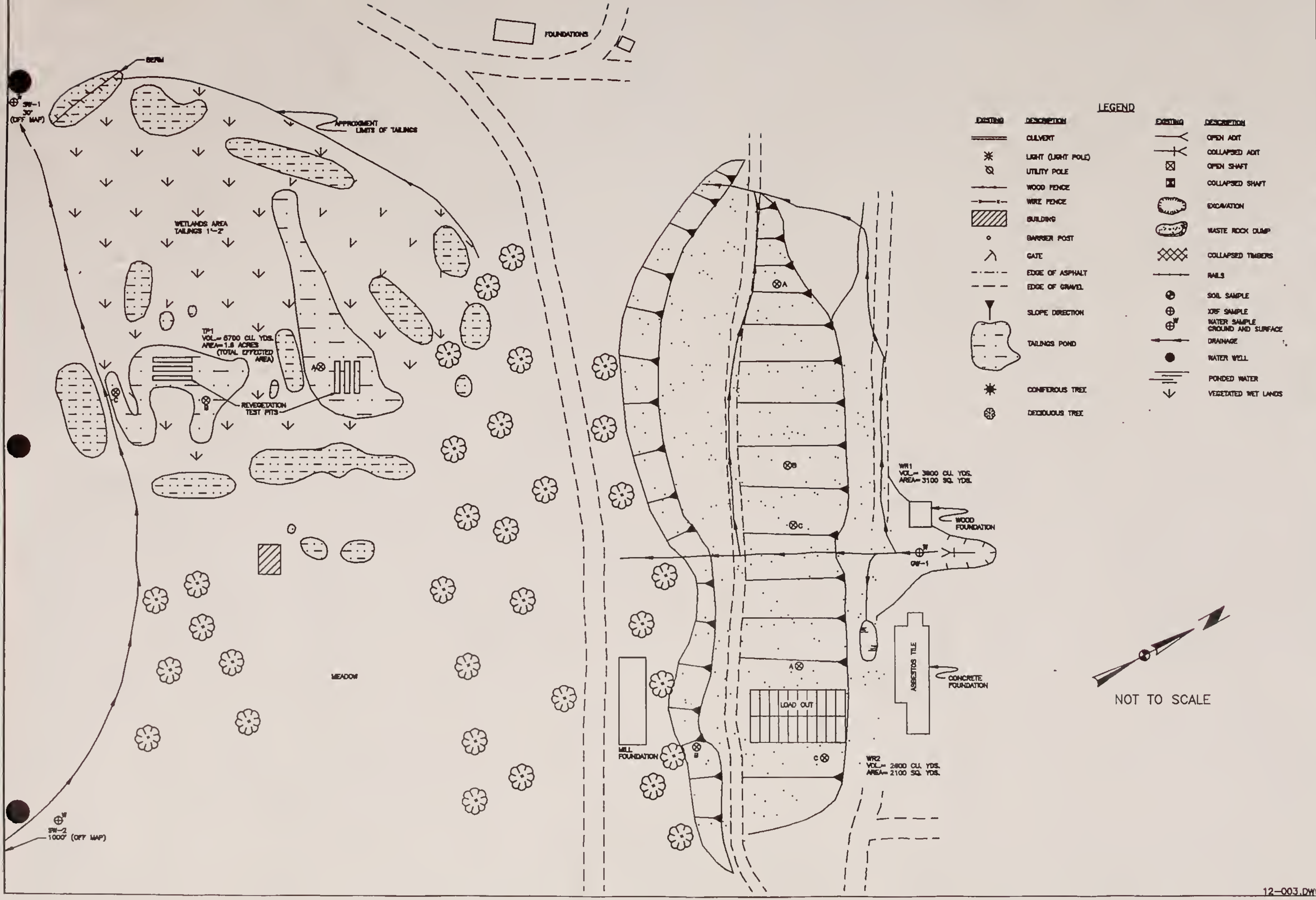


PIONEER
TECHNICAL SERVICES, INC.

CHAMPION, P.A. NO. 12-003

T06N, R08W, SECTION 33

SCALE: 1" = 1000'



DRAWN JTP DATE 29 NOV 93
DESIGNED TPR JOB NO. 93-17
APPROVED WJB F.B. NO.

PIONEER

THOMAS, DEAN & HOSKINS INC.
ENGINEERING CONSULTANTS
GREAT FALLS—BOZEMAN—KALISPELL MONTANA
SPOKANE WASHINGTON

TD&H

MONTANA DEPT. OF STATE LANDS
HAZARDOUS MATERIAL INVENTORY

CHAMPION PA# 12-003
OROFINO DISTRICT DEER LODGE COUNTY

SHEET NO.

12-003.DWG SHEETS

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures / vessels sound, are runon/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution(approximate % sand, silt, & clay): Fine gray silty clay, 25%; fine white/orange sand, 75%.

Determine tailings impoundment depth and describe stratification of the tailings if observable(based on texture and color): Maximum depth found was 6 feet. Most of the tails (Approx. 65%) have washed out of the impoundment area. Reduced zone present in lower levels of deeper piles remaining.

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): Dry to moist on surface; wet below and in drainage areas.

Describe condition of the tailings impoundment(Note condition of dams or structures, location of breaches): Badly breached

Comments on potential for mitigation: Tailings contain very low levels of metals; natural vegetation is pioneering and revegetated test plots are working. Regrade and isolate the stream channel prior to revegetation.

SOURCE INVENTORY FORM

SAMPLERS: Bullock, Flammang

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd^3)	LOCATION/DESCRIPTION	CONTAIN-MENT	pH SU (D/S)*	RADIO-ACTIVITY (mR/HR)	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
WR-1A	WR	3,900	Western waste pile 20' above ground near west end just east of knob	None	< 3.5 (D)	0.04	12-003-WR-1	07/16/93 1250	T-Metals, ABA
WR-1B	WR		25' up from bottom right by an aspen tree	None	4.8 (D)	0.05			
WR-1C	WR		1/2 way down slope on WR-1 15' west of adit discharge drainage	None	5.55 (D)	0.04			
WR-2A	WR	2,600	Approx. 10' west of ore bin 1/2 way up on the eastern WR-2	None	4.2 (D)	0.05			
WR-2B	WR		Directly below western part of loadout on lower part of WR-2 5' from top	None	4.6 (D)	0.05			
WR-2C	WR		East end of WR-2 in gray colored material approx. 25' east of loadout	None	6.8 (D)	0.05			
TP-1A-A	TAIL	5,700	Near southeast end of largest pile; 0'-2.5'	None	3.6 (D)	0.03	12-003-TP-1	07/16/93 1505	T-Metals, ABA
TP-1A-B	TAIL		Near southeast end of largest pile; 2.5'-5'	None	< 3.5 (D)	0.04			
TP-1A-C	TAIL		Near southeast end of largest pile; 5'-6'	None	< 3.5 (D)	0.04			
TP-1B-A	TAIL		On south pile near north end; 0'-1.5'	None	5.4 (D)	0.04			
TP-1B-B	TAIL		On south pile near north end; 1.5'-3'	None	3.6 (D)	0.04			
TP-1B-C	TAIL		On south pile near north end; 3-4.5'	None	4.8 (D)	0.04			
TP-1B-D	TAIL		Underlying soil; 4.5-5'	None	4.8 (D)	N/A	N/A	N/A	XRF Analysis
TP-1C-A	TAIL		In tailings bar north of stream; 0'-3'	None	< 3.5 (D)	0.03			
	ACM	Approx. 100 lbs.	On upper cement foundation east of adit	None					
SS-1	BKGRND	N/A	Background soil on ridge above adit	N/A	N/A	N/A	12-003-SS-1	07/16/93 1500	T-Metals

*D-Direct reading (Kelway Meter); S-Saturated Paste (Orion Meter)

Comments or deviations from SOPs: 12-003-WR-1 is composite of WR-1A through -1C and WR-2A through -2C. 12-003-TP-1 is composite of TP-1A-A through -1A-C, TP-1B-A through -1B-C, and TP-1C-A.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes X, No ___, Number: 1 Identification: Adit #1

Filled shafts: Yes ___, No X, Number: ___ Identification: ___

Seeps/Springs: Yes ___, No X, Number: ___ Identification: ___

Groundwater wells within 4 miles?: Yes X, No ___;
Number of well logs: 8

Distance to nearest well used for drinking? Approx. 1.5 miles

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW); Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter), temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?
Definite ___, Probable ___, Possible X, Unlikely ___.
The pH from adit is lower than neutral; metals concentrations in waste rock are low and visible sulfide content of waste rock is low; however, strong hydrogen sulfide gas smell is emanating from the adit.

Other observations/notes: N/A

GROUNDWATER INVENTORY FORM

SAMPLERS: Bullock, Flammang

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SOURCE	FLOW* cfs/gpm	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Depth ft	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
GW-1	AD	Mouth of Adit #1	0.027 cfs	5.92	540	-227	8.4	74	N/A	12-003-GW-1	07/16/93 1430	T-Metals, TDS, Hardness, Cl, SO4, NO2/NO3

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes X , No ___, Name(s): Unnamed tributary to Orofino Creek

Dry streambeds: Yes ____, No X , Name(s):

Other surface water: Yes X , No ___, Name(s)/Description: Water from Adit #1 ponds on bench south of adit entrance and runs off in several directions from the adit. Wetlands area present on TP-1.

Waste materials within any floodplain: Yes X , No ___ Source ID(s): TP-1

Approximate Flood frequency? X 1 yr, ___10 yr, ___100 yr

Estimated seasonal flow of stream(s) (cfs)? 0.24-0.4 during sampling
High Flow: 4 cfs , Average Flow: 0.5 cfs

Distance between waste source(s) and nearest surface water body (ft)? Runoff from Adit #1 flows across and next to WR-1 and -2. The unnamed tributary of Orofino Creek runs along the south side of TP-1, and tails have been deposited quite a way downstream. Wetlands are directly on TP-1.

Surface water draining onto or through waste sources: Yes X , No ____, Describe: Adit #1 discharge runs across WR-1 and -2. Water from wetlands on TP-1 most likely drain through the tailings. Tailings are present in the stream bank downstream from the site.

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?) Agriculture, wetlands

Observed erosional/sedimentation/stream turbidity problems? Yes X , No _____, Distance downstream (ft)? 1000'+ Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): Tailings are present in stream bank and sediments for at least 1000' downstream of the site.

SURFACE WATER INVENTORY FORM

SAMPLERS: Bullock, Flammang

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SAMPLE LOCATION	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Flow* cfs/gpm	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
SW-1	SW	25′ from tailings berm; downstream	7.27	276	276	8.8	78	0.24 cfs (M)	12-003-SW-1	07/16/93 1330	T-Metals, TDS, Hardness, Cl, SO4, NO2/NO3
SE-1	SE	25′ from tailings berm; downstream	N/A	N/A	N/A	N/A	N/A	N/A	12-003-SE-1	07/16/93 1330	T-Metals
SW-2	SW	Upstream from old cabin and small collapsed adit	7.92	302	229	6.5	96	0.40 cfs (M)	12-003-SW-2	07/16/93 1330	T-Metals, TDS, Hardness, Cl, SO4, NO2/NO3
SE-2	SE	Upstream from old cabin and small collapsed adit	N/A	N/A	N/A	N/A	N/A	N/A	12-003-SE-2	07/16/93 1400	T-Metals
SE-500	SE	500′ down from SW-1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	XRF Analysis
SE-1000	SE	1000′ down from SW-1 in beaver ponds	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	XRF Analysis

FLOW: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993):

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides?	(SO_3)
Presence of evaporative salt deposits?	(ESD)
Discolored or turbid seepage?	(SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?	
Presence of ferric hydroxide precipitates?	(FEOX)
Presence of burned or stressed vegetation?	(VEG)
pH ≤ 5.0	(pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? At least 20 acres at and below the old tailings impoundment area.

Wetlands present: Yes X , No ___, Describe: Wetlands present on TP-1 and approx. 1000' downstream of site where eroded tailings have collected.

Carbonate rocks/soils: Yes ___, No X , Describe: ___

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10 ___; 10-30 X ; 30-100 ___; 100-300 ___; 300-1,000 ___; 1,000-3,000 ___; 3,000-10,000 ___; 10,000 or greater ___; Comments ___

Nearest residence(ft or miles)? 1.5 miles

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Bullock, Flammang, Clark

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH /MODERATE/LOW/NONE)
WR-1	None	Partial	27,900	27,060	Yes	Moderate
WR-2	None	Partial	18,900	18,700	Yes	Moderate
TP-1	pH	Partial	69,700	41,800	Yes	Moderate
Adit 1	FEOX; low pH	N/A	N/A	N/A	N/A	N/A

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No X , Describe:____________

Population within 1 mile: 1-10___; 10-30___; 30-100___; 100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or greater___; Comments None

Evidence of recreational use on site: Yes X , No___, Describe: Beer cans and bottles; gunshells; jeep trail through site.

Accessibility - Fences, warning signs, closed roads? Unrestricted

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes___, No X , Comment____________
Wilderness Area - Yes___, No X , Comment____________
T&E Species Habitat - Yes___, No X , Comment____________
Bat Habitat - Yes___, No X , Comment____________

Primary Drainage___; Secondary Drainage X ; No Information___:

Riparian Habitat Quality - High___, Medium___, Low Not Rated
Wetlands Frontage - High___, Medium___, Low Not Rated
Fisheries Habitat and Species Classification - Not Rated
Sport Fishery Classification - Not Rated

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes___, No X , Number____, types and locations:___

Hazardous structures: Yes X , No___, Number 1 , types and locations: Ore bin/loadout on WR-2; has two compartments with 10'x10' openings at ground level on upper bench.

Unstable highwalls, pits, trenches, slopes: Yes___, No X , Number____, types and locations:____________

Unstable waste piles, impoundments, undercut banks: Yes X , No____, Number 2 , types and locations: WR-1 is oversteepened for much of it on upper part; lower part of WR-1 and WR-2 are at angle of repose.

Fire and/or Explosion hazards: Yes___, No X , Explain:____________

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Bullock, Flammang, Clark

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH /MODERATE/LOW/NONE)
WR-1	None	Partial	27,900	27,060	Yes	Moderate
WR-2	None	Partial	18,900	18,700	Yes	Moderate
TP-1	pH	Partial	69,700	41,800	Yes	Moderate
Adit 1	FEOX; low pH	N/A	N/A	N/A	N/A	N/A

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No_X_,
Describe:______________________________

Population within 1 mile: 1-10___; 10-30___; 30-100___; 100-300___;
300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or greater___;
Comments None

Evidence of recreational use on site: Yes_X_, No___, Describe: Beer cans and bottles; gunshells; jeep trail through site.

Accessibility - Fences, warning signs, closed roads? Unrestricted

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes___, No_X_, Comment______
Wilderness Area - Yes___, No_X_, Comment______
T&E Species Habitat - Yes___, No_X_, Comment______
Bat Habitat - Yes___, No_X_, Comment______

Primary Drainage___; Secondary Drainage_X_; No Information___:

Riparian Habitat Quality - High___, Medium___, Low Not Rated
Wetlands Frontage - High___, Medium___, Low Not Rated
Fisheries Habitat and Species Classification - Not Rated
Sport Fishery Classification - Not Rated

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes___, No_X_, Number____, types and locations:___

Hazardous structures: Yes_X_, No___, Number_1_, types and locations: Ore bin/loadout on WR-2; has two compartments with 10'x10' openings at ground level on upper bench.

Unstable highwalls, pits, trenches, slopes: Yes___, No_X_, Number____,
types and locations:______

Unstable waste piles, impoundments, undercut banks: Yes_X_, No____,
Number_2_, types and locations: WR-1 is oversteepened for much of it on upper part; lower part of WR-1 and WR-2 are at angle of repose.

Fire and/or Explosion hazards: Yes___, No_X_, Explain:______

Bibliography

Deckler, Jeffery Harris, Characterization of Four Inactive Hard Rock Mines in Western Montana, Thesis for Montana State University, Bozeman, Montana, August, 1982.

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MBMG, Sampling and Analysis Plan and Analytical Data for the Champion Mine, Provided by Ted Duaime, Date Unknown.

MBMG, Well Log Database, September 8, 1993.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0, Prepared by Montana Natural Resource Information System, December 1989.

MDSL/AMRB Files, Abandoned Mine Lands National Inventory, Phase II Problem Area Data Sheet for the Champion Mine, Prepared by Dick Juntunen, September 11, 1981.

MDSL/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for the Champion Mine, Prepared by Northern Engineering and Testing, June 20, 1988.

Northern Testing Laboratories, Report of Geotechnical Investigation Hard Rock Mine Dump and Mill Pond Project, Western Montana, Volume I, November 17, 1982, pp. 12 and 23.

USGS, Greater Helena Mining Region, Montana, Bulletin 842, Author Unknown, Date Unknown, pp. 281-282.

USGS, Topographic Map, Lockhart Meadows, Montana, 7 1/2 minute Quadrangle, 1989.

LABORATORY ANALYTICAL DATA

CHAMPION
PA NO. 12-003

Champion PA# 12-003
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - BULLOCK
INVESTIGATION DATE: 07/16/93

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
12-003-SE-1	49	175	1.7	71.9	14.5	32.6	25500	0.305	3560	42	24	7 UJ	143	NR
12-003-SE-2	7	67.2	0.6 U	7.2	4.5	8.3	11000	0.142	389	3 U	12	8 UJ	30	NR
12-003-TP-1	74	34	0.7	5.5	39.5	16.3	15700	0.869	238	9	37	7 UJ	33	NR
12-003-WR-1	54	30.4	1	9.5	22.6	39.5	26800	0.297	438	6	21	7 UJ	39	NR
BACKGROUND	24	289	1.6	17.4	7.8	17.2	17600	0.106	1760	5	11	7 UJ	64	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	TOTAL SULFUR ACID BASE t/1000t	NEUTRAL. POTENT. t/1000t	SULFUR ACID BASE POTENT. t/1000t	SULFATE SULFUR %	PYRITIC SULFUR %	ORGANIC SULFUR %	PYRITIC SULFUR ACID BASE t/1000t	SULFUR ACID BASE POTENT. t/1000t
12-003-WR-1	0.61	19.1	13.6	-5.5	0.48	0.01	0.12	0.31	13.3

WATER MATRIX ANALYSES

Metals in Water
Results in ug/L

FIELD ID	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
12-003-GW-1	4.68 J	8.47	10.20 J	75.60	6.83 U	1.55 U	62800	0.038 U	11600	55.1	1.04 J	30.7 U	14	500
12-003-SW-1	3.54	41.9	5.67 J	9.7 U	6.83 U	1.6	65	0.038 U	146	12.7 U	1.55 U	30.7 U	7.57 U	110
12-003-SW-2	2.81 J	38.20	2.57 U	9.70 U	6.83 U	1.55 U	11.8	0.038 U	4.08 U	12.7 U	0.83 J	30.7 U	7.57 U	107

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Wet Chemistry
Results in mg/l

FIELD I.D.	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
12-003-GW-1	984	5.3	539	< 0.05	NR
12-003-SW-1	163	< 5.0	35	< 0.05	NR
12-003-SW-2	151	< 5.0	18	< 0.05	NR

LEGEND

SE1 - 25' from tailings berm; downstream.
SE2 - Upstream from old cabin and small collapsed adit.
TP1 - Composite of TP1A-A through 1A-C, 1B-A through 1B-C, and 1C-A.
WR1 - Composite of subsamples WR1A, 1B, 1C, 2A, 2B, and 2C.
BACKGROUND - From the Champion Mine (12-003-SS-1).

GW1 - Discharge from adit #1.
SW1 - Same as sample SE1.
SW2 - Same as sample SE2.

XRF ANALYSIS RESULTS

CHAMPION
PA NO. 12-003

Mine Name: Champion PA# 12-003
XRF Field Analyses
Results in PPM

XRF SAMPLE ID	CrHI	K	Ca	Ti	CrLO	Mn	Fe	Co	Cu	Zn	As	Sr
12-003-SE-1000		12072.5	8110.03			906.857 *	24701.8			129.719	39.7751 *	218.285
12-003-SE-500		15619.6	7256.4			5363.84	37399.2	290.47 *		250.964	144.589	142.962
12-003-SS-1		17101	9951.83			7633.03	26657.2		51.1228 *	275.385	238.61	373.447
12-003-TP1A-A		41421.4	2429.07				11925.5			34.8543 *	95.6017 *	57.2553
12-003-TP1A-B		36708.2	3330.3				14654.5			74.8729 *	85.49 *	62.5971
12-003-TP1A-C		19221.7	2256			291.819 *	14923.1			35.8577 *	174.071	55.3004
12-003-TP1B-A		12405.2	1120.55				11121.7			66.541 *	81.0885	46.0207
12-003-TP1B-B		31177.7	1585.05				4760.4				59.248 *	53.23
12-003-TP1B-C		37078.5	4011.24			996.561 *	19581.3			92.0083 *	121.479	127.591
12-003-TP1B-D		18140.4	10382.4			1061.92 *	36004.9			118.804 *	34.6299 *	359.697
12-003-TP1C-A		32054.2	1661.41			238.509 *	9713.85				95.5843	78.3239
12-003-TP-1-COMP		33563.2	2475.75			287.27 *	13924.1				94.9743	75.1056
12-003-WR1-A		33336.9	12622.6				28723.3			84.2529 *	132.46	84.1187
12-003-WR1-B		32205	9481.95		220.874 *	560.073 *	37069.1			132.357	121.48	239.413
12-003-WR1-C		30978	8759.28			559.449 *	31545.4			96.074 *	53.2812 *	179.515
12-003-WR2-A		28621.2	2352.68				44232.6			57.5067 *	152.249	82.1155
12-003-WR2-B		31494.1	2528.61	1639.66			39091.9			85.2031 *	216.514	53.0165
12-003-WR2-C		23522.8	19380.3			539.525 *	22095.6		137.389 *	128.237	43.734 *	528.847
12-003-WR-1-COMP		26677.1	11856.4			359.503 *	31605.6			78.9069 *	123.153	271.408

	Zr	Hg	Mo	Pb	Rb	Cd	Sb	Ba	Ag	U	Th
12-003-SE-1000	123.249				122.665			391.077		13.8918 *	9.17815 *
12-003-SE-500	71.9976		13.4397 *	30.1882 *	201.387			285.805		11.8033 *	20.2246 *
12-003-SS-1	162.617				166.343			632.975		12.924 *	20.5053 *
12-003-TP1A-A	51.6209		22.5519		515.94			350.436		23.7998 *	
12-003-TP1A-B	58.0105		222.804	39.287 *	461.302			253.499	133.16 *		10.9374 *
12-003-TP1A-C	244.083		39.7836		218.852		63.246 *	359.332	116.052 *		14.6276 *
12-003-TP1B-A	45.4664		67.1505		194.203			207.403			
12-003-TP1B-B	38.0651		13.6477 *		354.853			307.39	94.1724 *	17.0651 *	
12-003-TP1B-C	62.0812		43.2577	18.0202 *	408.547			570.389		20.4397 *	12.567 *
12-003-TP1B-D	270.334				247.635			723.821		21.3567 *	23.6367
12-003-TP1C-A	52.2184		24.4948		398.732			365.072		21.2586 *	8.66371 *
12-003-TP-1-COMP	60.9058		60.2672		362.747		62.3199 *	389.762		19.0061 *	6.85035 *
12-003-WR1-A	152.329		70.4505		379.428			286.88			11.965 *
12-003-WR1-B	110.268		36.1512		343.943		59.4597 *	1019.29	140.503 *	14.1711 *	12.2769 *
12-003-WR1-C	131.915		8.59511 *		312.499			640.848		17.3341 *	18.6264 *
12-003-WR2-A	151.292		28.1104		373.955			473.599	94.7066 *	15.9982 *	18.8761 *
12-003-WR2-B	130.576		8.98923 *		334.813			272.274	93.0833 *		15.0709 *
12-003-WR2-C	127.612		10.2902 *		123.258			644.724			21.3372
12-003-WR-1-COMP	129.312		18.3548		265.389			497.27		12.8714 *	16.6845 *

* - Estimated Quantity
$ - Unvalidated Data

ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS) SCORESHEET

CHAMPION
PA NO. 12-003

MDSL AMRB/PIONEER 4/9/93

AIMSS SCORESHEET

SITE NAME: CHAMPION
PA NUMBER: 12-003

LINE NO.				
		GROUNDWATER PATHWAY		
1	GW - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
2		EXCEEDENCES		0
3A		CONTAINMENT		20
3B		GW DEPTH		20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B	400
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C	400
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	1.605
6	GW - TARGETS	WELLS - 1 MI. x 2.5		0.0
7		WELLS - 1 TO 4 MI		8
8		NEAREST WELL		0
9		TARGETS SCORE	LINES 6 + 7 + 8	8.0
10		**GROUNDWATER SCORE**	LINES 4 x 5 x 9	5136
		SURFACE WATER PATHWAY		
11	SW - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		300
12		EXCEEDENCES		0
13A		CONTAINMENT		20
13B		DISTANCE TO SW		20
13C		POTENTIAL TO RELEASE	LINES 13A x 13B	400
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C	700
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	2.249
16	SW - TARGETS	DRINKING WATER POP'N		0
17		IMPACTED DRAINAGE		1
18		WETLANDS		10
19		FISHERY		0
20		RECREATION		0
21		IRRIGATION/STOCK		2
22		T & E SPECIES HABITAT		0
23		TARGETS SCORE	SUM LINES 16 - 22	13
24		**SURFACE WATER SCORE**	LINES 14 x 15 x 23	20466
		AIR PATHWAY		
25	AIR - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
26A		CONTAINMENT		15
26B		DISTANCE TO POPULATION		5
26C		POTENTIAL TO RELEASE	LINES 26A x 26B	75
27		LIKELIHOOD SCORE	LINES 25 + 26C	75
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.018
29	AIR - TARGETS	POPULATION - 4 MILES		10
30		NEAREST RESIDENCE		0
31		WETLANDS		0
32		PARKS / WILDERNESS		0
33		T & E SPECIES HABITAT		0
34		TARGETS SCORE	SUM LINES 29 - 33	10
35		**AIR PATHWAY SCORE**	LINES 27 x 28 x 34	14
		DIRECT CONTACT PATHWAY		
36	LIKELIHOOD OF EXPOSURE	OBSERVED EXPOSURE		50
37A		ACCESSIBILITY		20
37B		DISTANCE TO POPULATION		5
37C		POTENTIAL EXPOSURE	LINES 37A x 37B	100
38		LIKELIHOOD SCORE	LINES 36 + 37C	150
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.017
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE		0
41		NEAREST RESIDENCE		0
42		RECREATIONAL USE		10
43		TARGETS SCORE	SUM LINES 40 - 42	10
44		**DIRECT CONTACT SCORE**	LINES 38 x 39 x 43	26
45	**TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE**	(LINES 10 + 24 + 35 + 44) / 100,000		**0.26**

SITE NAME: CHAMPION
PA NUMBER: 12-003

LINE NO.		SITE SAFETY		
1	THREAT	ACCESSIBILITY		20
2		OPEN SHAFTS	100 EA.	0
3		OPEN ADITS	50 EA.	0
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	0
5		HAZ. STRUCTURES	40 EA.	40
6		EXPLOSIVES		0
7		HAZ. MATERIALS		100
8		HAZARDS SCORE	SUM LINES 2 - 7	140
9		POPULATION - 1 MILE		0
10	TARGETS	NEAREST RESIDENCE		0
11		RECREATIONAL USE		10
12		TARGETS SCORE	SUM LINES 9 - 11	10
13		**SITE SAFETY SCORE**	(LINES 1 x 8 x 12) / 1,000	**28.00**

SUMMARY OF HISTORICAL ANALYTICAL DATA
FROM OTHER SOURCES

LAB ID	SAMPLE ID	Cr	Crc	Crq	Ni	Nic	Niq	Cu	Cuc	Cuq	Zn	Znc	Znq	As	Asc	Asq	Ag	Agc	Agq
92Q637	CUSRB20	0.00	U		0.00	U		1.74	B		7.25	B		0.00	U		0.00	U	
92Q638	CUSS10L	0.00	U		0.00	U		3.54	B		25.03	B		10.57	B		0.00	U	
92Q639	CUSS20L	0.00	U		11.59	B		3546.00			6824.00			6.52	B		0.00	U	
92Q640	CUSS30L	0.00	U		3.23	B		90.62			2756.00			1.63	B		0.00	U	
92Q641	CUSS40L	0.63	U		0.00	U		10.09	B		59.64			4.90	B		0.00	U	
92Q642	CUSS50L	0.00	U		0.00	U		38.08	B		498.42			4.76	B		0.00	U	
92Q643	CUSS60L	0.00	U		0.00	U		38.09	B		511.40			3.88	B		0.00	U	
TOTAL RECOVERABLE METALS: (ppb)																			
92Q958	CUSS30L	0.00	U		4.91	B		451.54			3523.00			63.79			0.00	U	
92Q959	CUSS40L	0.00	U		0.00	U		7.79	B		49.38			3.68	B		0.00	U	
92Q960	CUSS50L	0.00	U		0.00	U		72.74			520.38			12.70	B		0.00	U	
92Q961	CUSS60L	0.00	U		0.00	U		71.35			1175.00			12.61	B		0.00	U	

MORNING GLORY

Site visited, but no sample results available.

CHAMPION MINE

DISSOLVED METALS: (ppb)

LAB ID	SAMPLE ID	Cr	Crc	Crq	Ni	Nic	Niq	Cu	Cuc	Cuq	Zn	Znc	Znq	As	Asc	Asq	Ag	Agc	Agq
92Q819	DCHS10M	0.00	U		9.05	B		0.00	U		0.00	U		0.82	B		0.00	U	

MAMMOTH TAILINGS

DISSOLVED METALS: (ppb)

LAB ID	SAMPLE ID	Cr	Crc	Crq	Ni	Nic	Niq	Cu	Cuc	Cuq	Zn	Znc	Znq	As	Asc	Asq	Ag	Agc	Agq
92Q1482	JBSTRIP	-1.76	U		-1.18	U		-0.74	U		1.91	U		-0.88	U		-1.14	U	
92Q1514	JBSB10L	-1.12	U		0.13	U		1.56	U		63.63			-0.55	U		-1.14	U	
TOTAL RECOVERABLE METALS: (ppb)																			
92Q1515	JBSB10L	0.00	U		0.00	U		0.00	U		0.00	U		0.00	U		0.00	U	
92Q1515	JBSB10L	0.00	U		0.00	U		0.00	U		5.65	B		1.55	B		0.00	U	

NONPAREIL MINE

LAB ID	SAMPLE ID	Cd	Cdc	Cdq	Ba	Bac	Baq	Pb	Pbc	Pbq	Hg	Hgc	Hgq
92Q637	CUSRB20	0.63	B		6.69	B		0.00	U				
92Q638	CUSS10L	0.67	B		17.38	B		1.29	B				
92Q639	CUSS20L	242.32			23.08	B		89.75					
92Q640	CUSS30L	44.57			27.83	B		1.47	B				
92Q641	CUSS40L	0.91	B		27.32	B		0.96	B				
92Q642	CUSS50L	7.09	B		28.35	B		1.40	B				
92Q643	CUSS60L	7.44	B		23.05	B		1.34	B				

TOTAL RECOVERABLE METALS: (ppb)

LAB ID	SAMPLE ID	Cd	Cdc	Cdq	Ba	Bac	Baq	Pb	Pbc	Pbq	Hg	Hgc	Hgq
92Q958	CUSS30L	46.23			31.74	B		11.26					
92Q959	CUSS40L	0.00	U		21.40	B		0.00	U				
92Q960	CUSS50L	5.91	B		21.73	B		0.90	B		0.37		
92Q961	CUSS60L	5.90	B		23.95	B		1.00	B				

MORNING GLORY

Site visited, but no sample

CHAMPION MINE

DISSOLVED METALS: (ppb)

LAB ID	SAMPLE ID	Cd	Cdc	Cdq	Ba	Bac	Baq	Pb	Pbc	Pbq	Hg	Hgc	Hgq
92Q819	DCHS10M	0.88	B		19.74	B		0.00	U				

MAMMOTH TAILINGS

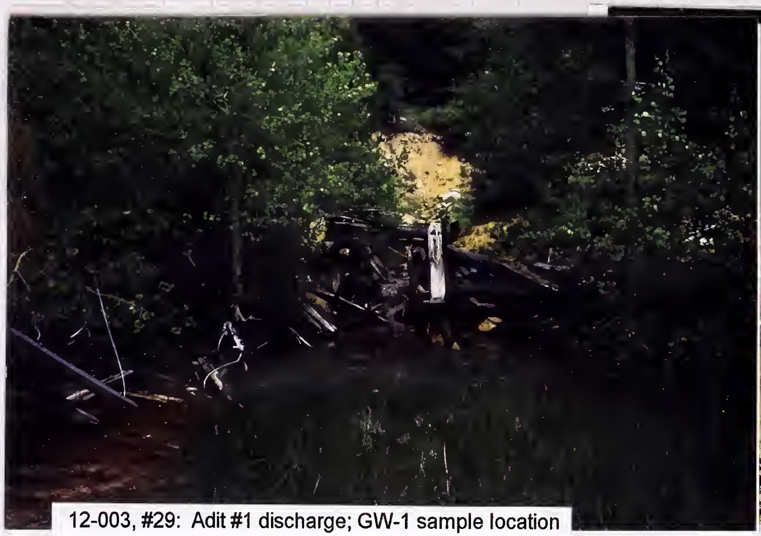
DISSOLVED METALS: (ppb)

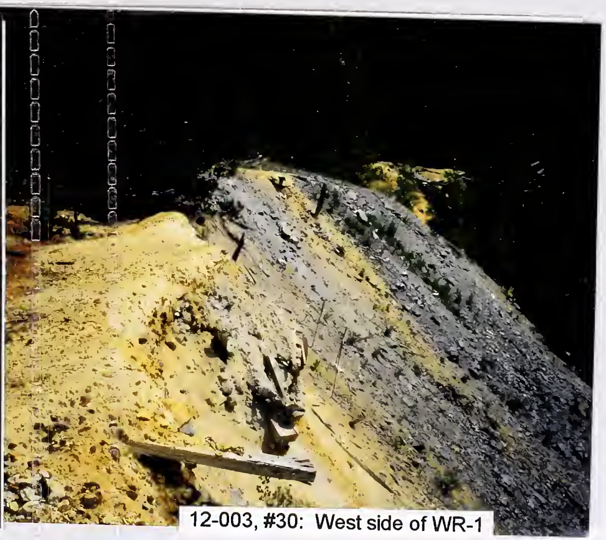
LAB ID	SAMPLE ID	Cd	Cdc	Cdq	Ba	Bac	Baq	Pb	Pbc	Pbq	Hg	Hgc	Hgq
92Q1482	JBSTRIP	-0.92	U		-1.52	U		-1.16	U				
92Q1514	JBSB10L	0.59	U		16.21	B		-0.63	U				

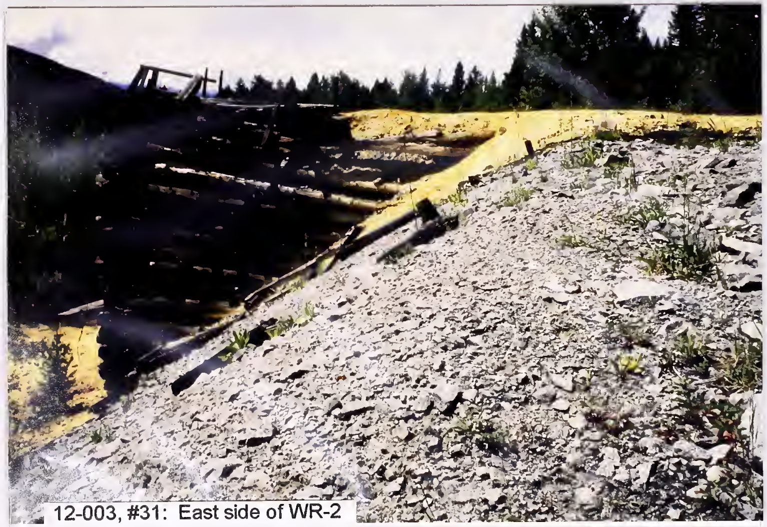
TOTAL RECOVERABLE METALS: (ppb)

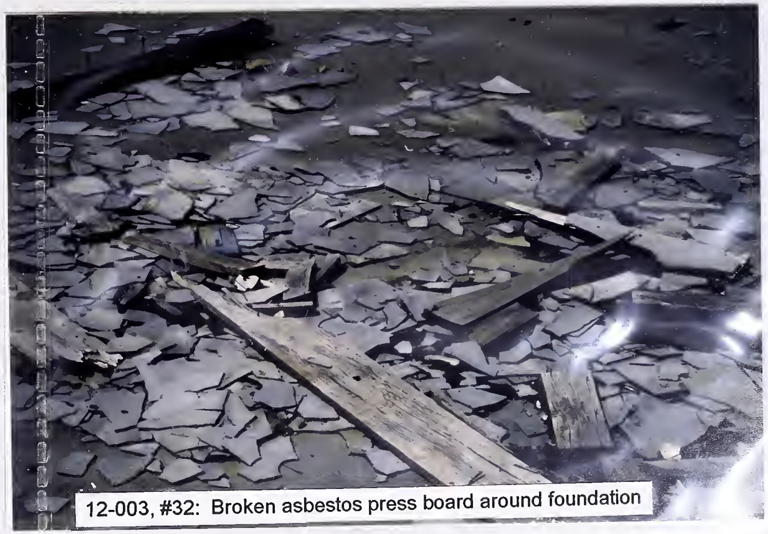
LAB ID	SAMPLE ID	Cd	Cdc	Cdq	Ba	Bac	Baq	Pb	Pbc	Pbq	Hg	Hgc	Hgq
92Q1515	JBSB10L	0.00	U		17.10	B		0.00	U		0.07	B	
92Q1515	JBSB10L	0.00	U		14.93	B		0.00	U		0.07	B	

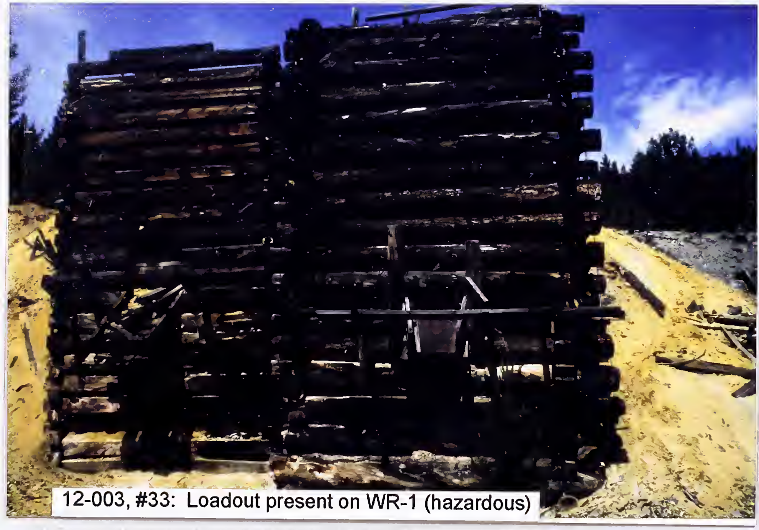
NONPAREIL MINE


12-003, #29: Adit #1 discharge; GW-1 sample location


12-003, #30: West side of WR-1


12-003, #31: East side of WR-2


12-003, #32: Broken asbestos press board around foundation


12-003, #33: Loadout present on WR-1 (hazardous)

12-003, #34: TP-1A

12-003, #35: TP-1B

12-003, #37: TP-1C

SILVER LAKE

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY SITE INVESTIGATION LOG SHEET

Mine/Site Name: CABLE MINE PA#: 12-002

Date: September 10, 1993 Time: 1100

Field Team Leader: Babits, Pioneer

Sampling Personnel: Pierson, TD&H

Visitors: Rauno Perttu, V.P., Cable Mountain Mine, Inc.

Weather/Seasonality Observations: Warm (65°F to 70°F), slight breeze (7 mph), clear; cool, wet spring and summer.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): Photos taken were misplaced. Video Tape No. 3

General Comments/Observations (not covered specifically in attached Inventory Forms): No samples were collected at this site because it is an active mine. The historic mill is completely gone. The historic tailings are piled at the new mill and being reprocessed, the old waste rock is mostly gone (reprocessed), and the one adit has a discharge that is being piped to the reprocessing facility.

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: No remediation is necessary.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): CABLE MINE PA#: 12-002

Legal Description: T 5N ;R 13W ;Sec. 10 , SW1/4 ___1/4 ___1/4

County: DEERLODGE Mining District: SILVER LAKE

Latitude: N 46° 12' 02" Longitude: W 113° 13' 00"

Primary Drainage Basin and Code: Warm Springs Creek/17010201
Secondary Drainage Basin: Cable Creek

USGS Quadrangle map name(s): Silver Lake

Mine Type/Commodities: Hardrock/Gold, Silver, Copper, Tungsten

Activity Status: Active X ,Inactive/Exploration___,Abandoned___.

Ownership status: Known YX N__; private/public? Private
Owner, Agent, or Contact(Include address and phone when available): Lou Henerson, c/o Cable Mountain Mine, Inc., 5143 Sunset Boulevard, Los Angeles, CA 90027.

Relationship to other mines/sites in the area/district: The Silver Lake Millsite is located two miles to the southwest.

Regulatory Status (Activity by other agencies)? Hardrock permits? Past Reclamation Activities? Hardrock permit No. 00134.

General site features: Elevation 6800' , Slope 25° ,
Aspect South

Land use: Mining X , Recreational___, Residential___, Urban___,
Agricultural___, Other(Specify)

Area of disturbed/unvegetated lands? 10 acres.
Dimensions:

Predominant vegetation types: Pine

Access: roads - good X ,poor___,4wd___,trail___.
Other logistical considerations (proximity to other sites). Locked gates when not operating with 24-hour guards.

Well logs within 1 mile radius; water rights 15 mi downstream (Attach MBMG Well Log Printout(s): There is 1 well log within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). Limestone belonging to Hazmark Formation surrounded by granite. The site lies approx. 1,000 feet above the headwaters of Cable Creek, which flows into Warm Springs Creek approx. 3 miles downstream.

Mining/milling history, ore type/tenor, host rock, gangue: The site was discovered in 1866 and operated until 1951. It started operating again in 1988 and is operating at the present time. There are two types of ore deposits. One is known as the Lake Ore Body that occurs as a contact metamorphic type in marble (contains native gold, chalcopyrite, and pyrite). The second is a Cornish ore body containing gold, chalcopyrite, and pyrite in a gangue of calcite.

Mine Operation?

Shafts -	Yes	No X	#	Comment
Adits -	Yes X	No	# 1	Comment Open
Pits -	Yes	No X	#	Comment
Placers -	Yes	No X	#	Comment
Other -	Yes	No X	#	Comment

Mill Operation? Yes X, No . If yes answer the next three questions:

Period(s) of Operation: 1867-1877 (old mill); 1877-1891 (new mill); 1988 to present

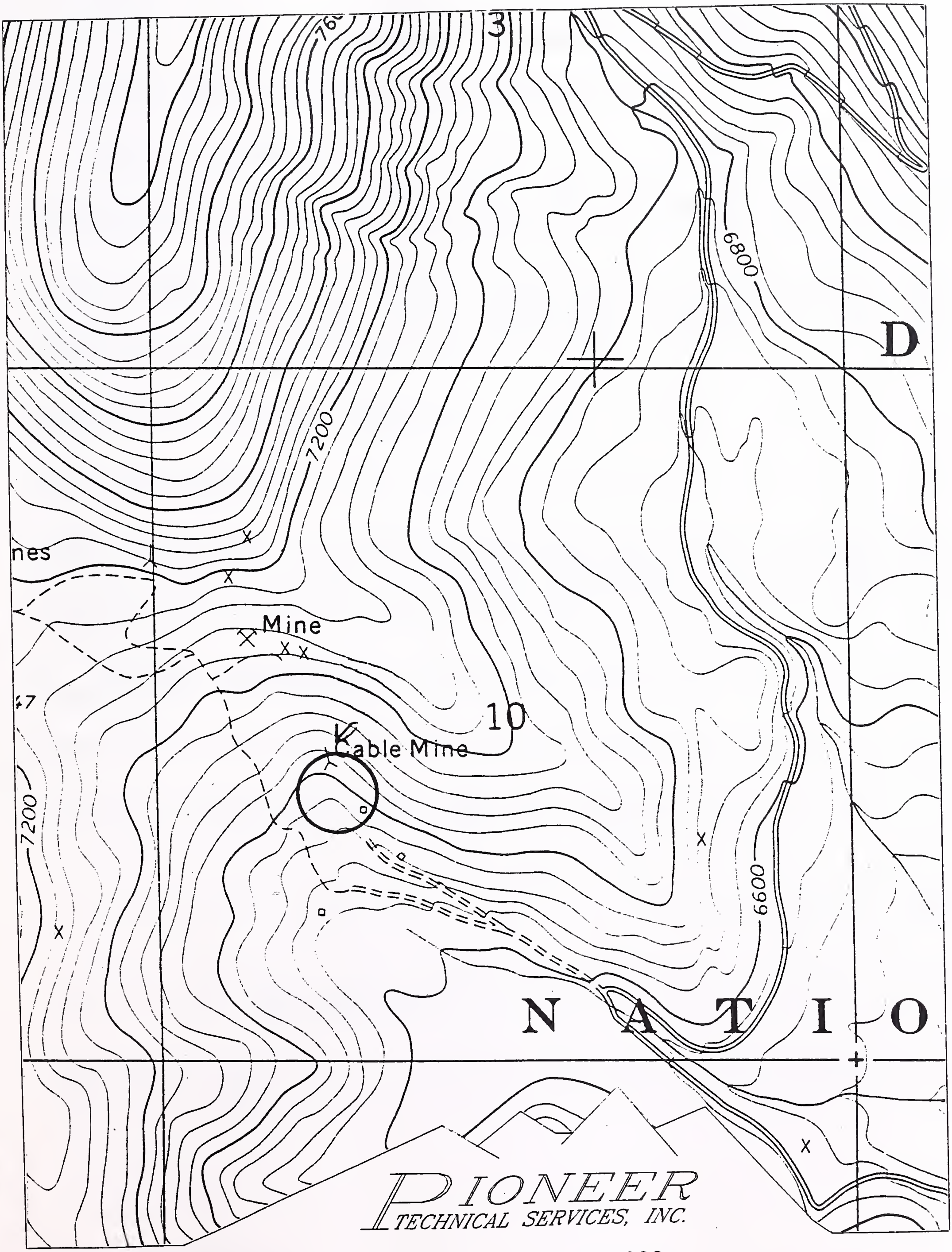
Origin of Ore Milled - Custom Mill Dedicated Mill X ; Number and names of mines that supplied mill feed: Unknown

Process? Hg-amalgam, CN$^-$ leach (vat, heap), floatation, smelting?
Hg amalgamation

Montana Bureau of Mines and Geology
Water Well Log Data

11/15/1993

Well No.	Location	Depth	Yield	Static Water Level
M:52240	05N 13W 09	160.0	1.0	67.00



PIONEER
TECHNICAL SERVICES, INC.

CABLE, P.A. NO. 12-002
T05N, R13W, SECTION 10
SCALE: 1" = 1000'

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures / vessels sound, are runon/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): Fine

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): Piles

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): Moist

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): No impoundment

Comments on potential for mitigation: Tailings are being reprocessed at the present time.

SOURCE INVENTORY FORM

SAMPLERS: ____________________

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd^3)	LOCATION/DESCRIPTION	CONTAIN-MENT	pH SU (D/S)*	RADIO-ACTIVITY (mR/HR)	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
No samples were taken.									

*D-Direct reading(Kelway Meter); S-Saturated Paste(Orion Meter)

Comments or deviations from SOPs: ____________________

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes X , No___, Number: 1 Identification: One adit on site; the water however is piped to the processing facility.

Filled shafts: Yes___, No X , Number:____ Identification:____

Seeps/Springs: Yes___, No X , Number:____ Identification:____

Groundwater wells within 4 miles?: Yes X , No___;
Number of well logs: 376

Distance to nearest well used for drinking? 2 miles

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW); Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter), temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?
Definite____, Probable____, Possible____, Unlikely X .
Uncontained source in area of shallow water table, but past water data does not show elevated metals.

Other observations/notes: Chen-Northern has installed one monitoring well downgradient of site. No information on total depth or static water level is provided in the operating report.

GROUNDWATER INVENTORY FORM

SAMPLERS: ____________________

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SOURCE	FLOW* cfs/gpm	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Depth ft	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
No samples were taken.												

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): ____________________

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes X , No___, Name(s): Cable Creek

Dry streambeds: Yes____, No X , Name(s):

Other surface water: Yes____, No X , Name(s)/Description:

Waste materials within any floodplain: Yes X , No___ Source ID(s): Tailings

Approximate Flood frequency? X 1 yr, ___10 yr, ___100 yr

Estimated seasonal flow of stream(s) (cfs)? Unknown
High Flow:___________, Average Flow:_____________

Distance between waste source(s) and nearest surface water body (ft)? 0 feet

Surface water draining onto or through waste sources: Yes____, No X ,
Describe:

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Fishery, irrigation

Observed erosional/sedimentation/stream turbidity problems? Yes_____, No X , Distance downstream (ft)?________ Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present):

SURFACE WATER INVENTORY FORM

SAMPLERS: ______

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SAMPLE LOCATION	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Flow* cfs/gpm	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
No samples were taken.											

FLOW: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): ______

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides?	(SO_3)
Presence of evaporative salt deposits?	(ESD)
Discolored or turbid seepage?	(SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?	
Presence of ferric hydroxide precipitates?	(FEOX)
Presence of burned or stressed vegetation?	(VEG)
pH ≤ 5.0	(pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? 10 acres

Wetlands present: Yes_X_, No___, Describe: Marsh

Carbonate rocks/soils: Yes_X_, No___, Describe: Limestone

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10___; 10-30___; 30-100___; 100-300_X_; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or greater___; Comments

Nearest residence(ft or miles)? 2 miles

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: ______________________________

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH /MODERATE/LOW/NONE)
WR	None	Moist	Unknown	Unknown	Yes	Observed
TP	None	Moist	Unknown	Unknown	Yes	Low/Moderate

Notes and Clarifications: ______________________________

____

____

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes_X_, No____,
Describe:____

Population within 1 mile: 1-10___; 10-30___; 30-100___; 100-300___;
300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or greater___;
Comments_None________________________________

Evidence of recreational use on site: Yes___, No_X_, Describe:________

Accessibility - Fences, warning signs, closed roads?_Closed roads and night watchman_

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes___, No_X_, Comment____________
Wilderness Area - Yes___, No_X_, Comment____________
T&E Species Habitat - Yes_X_, No___, Comment_Bald Eagle_______
Bat Habitat - Yes_X_, No___, Comment_Adit_____________

Primary Drainage_X_; Secondary Drainage___; No Information___:

Riparian Habitat Quality - High___, Medium_X_, Low___
Wetlands Frontage - High___, Medium_X_, Low___
Fisheries Habitat and Species Classification - _2_
Sport Fishery Classification - _4_

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes_X_, No___, Number_1_, types and locations:___
Adit_______________________________________

Hazardous structures: Yes___, No_X_, Number____, types and locations:_

Unstable highwalls, pits, trenches, slopes: Yes___, No_X_, Number____,
types and locations:____________________________

Unstable waste piles, impoundments, undercut banks: Yes____, No_X_,
Number____, types and locations:______________________

Fire and/or Explosion hazards: Yes___, No_X_, Explain:______________

Bibliography

Chen-Northern, Inc., Cable Mountain Mine Operational Water Resource Monitoring Report, March 1991.

MBMG, Cable Mine, Deerlodge County, Form 39, 1987 and 1988.

MBMG, Mineral and Industry File 90.0, Cable Mine, Deerlodge County, Montana.

MBMG, Well Log Database, September 8, 1993.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0, Prepared by Montana Natural Resource Information System, December 1989.

USGS, Topographic Map, Silver Lake, Montana, 7 1/2 minute Quadrangle, 1971.

ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS) SCORESHEET

CABLE
PA NO. 12-002

AIMSS SCORESHEET

SITE NAME: CABLE
PA NUMBER: 12-002

LINE NO.				
		GROUNDWATER PATHWAY		
1		OBSERVED RELEASE		0
2		EXCEEDENCES		0
3A	GW - LIKELIHOOD OF RELEASE	CONTAINMENT		20
3B		GW DEPTH		20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B	400
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C	400
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.000
6		WELLS - 1 MI. x 2.5		2.5
7	GW - TARGETS	WELLS - 1 TO 4 MI		375
8		NEAREST WELL		0
9		TARGETS SCORE	LINES 6 + 7 + 8	377.5
10		**GROUNDWATER SCORE**	LINES 4 x 5 x 9	0
		SURFACE WATER PATHWAY		
11		OBSERVED RELEASE		0
12	SW - LIKELIHOOD OF RELEASE	EXCEEDENCES		0
13A		CONTAINMENT		20
13B		DISTANCE TO SW		20
13C		POTENTIAL TO RELEASE	LINES 13A x 13B	400
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C	400
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.000
16		DRINKING WATER POP'N		0
17		IMPACTED DRAINAGE		0
18		WETLANDS		0
19	SW - TARGETS	FISHERY		10
20		RECREATION		5
21		IRRIGATION/STOCK		2
22		T & E SPECIES HABITAT		5
23		TARGETS SCORE	SUM LINES 16 - 22	22
24		**SURFACE WATER SCORE**	LINES 14 x 15 x 23	0
		AIR PATHWAY		
25		OBSERVED RELEASE		0
26A	AIR - LIKELIHOOD OF RELEASE	CONTAINMENT		15
26B		DISTANCE TO POPULATION		5
26C		POTENTIAL TO RELEASE	LINES 26A x 26B	75
27		LIKELIHOOD SCORE	LINES 25 + 26C	75
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.000
29		POPULATION - 4 MILES		100
30		NEAREST RESIDENCE		0
31	AIR - TARGETS	WETLANDS		10
32		PARKS / WILDERNESS		0
33		T & E SPECIES HABITAT		5
34		TARGETS SCORE	SUM LINES 29 - 33	115
35		**AIR PATHWAY SCORE**	LINES 27 x 28 x 34	0
		DIRECT CONTACT PATHWAY		
36		OBSERVED EXPOSURE		0
37A	LIKELIHOOD OF EXPOSURE	ACCESSIBILITY		1
37B		DISTANCE TO POPULATION		5
37C		POTENTIAL EXPOSURE	LINES 37A x 37B	5
38		LIKELIHOOD SCORE	LINES 36 + 37C	5
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.000
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE		0
41		NEAREST RESIDENCE		0
42		RECREATIONAL USE		0
43		TARGETS SCORE	SUM LINES 40 - 42	0
44		**DIRECT CONTACT SCORE**	LINES 38 x 39 x 43	0
45	**TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE** (LINES 10 + 24 + 35 + 44) / 100,000			**0.00**

SITE NAME: CABLE
PA NUMBER: 12-002

SITE SAFETY

LINE NO.				
1	THREAT	ACCESSIBILITY		1
2		OPEN SHAFTS	100 EA.	0
3		OPEN ADITS	50 EA.	50
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	0
5		HAZ. STRUCTURES	40 EA.	0
6		EXPLOSIVES		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 - 7	50
9		POPULATION - 1 MILE		0
10	TARGETS	NEAREST RESIDENCE		0
11		RECREATIONAL USE		0
12		TARGETS SCORE	SUM LINES 9 - 11	0
13		**SITE SAFETY SCORE**	(LINES 1 x 8 x 12) / 1,000	**0.00**

SUMMARY OF HISTORICAL ANALYTICAL DATA
FROM OTHER SOURCES

CABLE CREEK MINE SURFACE WATER DATA
Metals Data

Station	Sample Type	Sample Date	Sample Time	Arsenic Total		Cadmium Total		Copper Total		Iron Total		Lead Total		Mercury Total		Silver Total		Zinc Total	
CC-01	N	10/21/88		0.016		0.005	U	0.02	U			0.03		0.0005	U			0.02	U
CC-01	N	05/02/89		0.012		0.005	U	0.02	U	0.08		0.02	U			0.02	U	0.02	U
CC-01	N	05/02/90	1715	0.011		0.0007		0.001	U	0.05	U	0.001	U	0.0002	U			0.01	U
CC-01	N	12/03/90	1250	0.011		0.001	U	0.01	U	0.06		0.001	U	0.0002	U	0.02	U	0.01	U
CC-04	N	10/21/88		0.005	U	0.005	U	0.02	U			0.02	U	0.0005	U			0.02	U
CC-04	N	05/02/89		0.005	U	0.005	U	0.02	U	0.61		0.02	U			0.02	U	0.02	U
CC-04	N	05/02/90	1550	0.005	U	0.0003		0.011		1.11		0.001	U	0.0002	U			0.01	U
CC-04	N	12/03/90	1200	0.005	U	0.001	U	0.01	U	0.29		0.001	U	0.0002	U	0.02	U	0.01	U

Notes: 1) Sample type is defined as: N - Natural.
2) Data-quality analysis codes are defined as: U - Less than detection limits.
3) Blank values indicate parameters not determined.
ow is defined as: NG - Not gaged.

CABLE CREEK MINE SURFACE WATER DATA
Anions Data

Station	Sample Type	Sample Date	Calcium	Magnesium	Potassium	Sodium	Total Alkalinity	Hardness	Chloride	Fluoride	Nitrate and Nitrite as N	Sulfate
CC-01	N	10/21/88										
CC-01	N	05/02/89	35	14	1	5	129	145	1	0.10	0.16	31
CC-01	N	05/02/90	35	14	1	6	109	145	1 U	0.09	0.14	35
CC-01	N	12/03/90	34	15	2	4	115	147	1 U	0.10 U	0.05	38
CC-04	N	10/21/88										
CC-04	N	05/02/89	32	6	1	3	69	105	1	0.10	0.04	31
CC-04	N	05/02/90	24	5	1 U	4	65	81	1 U	0.05 U	0.03	11
CC-04	N	12/03/90	30	5	1 U	4	91	96	1 U	0.10 U	0.05 U	12

Notes: 1) Sample type is defined as: N - Natural.
2) Data-quality analysis codes are defined as: U - Less than detection limits.
3) Blank values indicate parameters not determined.
4) Flow is defined as: NG - Not gaged.

CABLE CREEK MINE SURFACE WATER QUALITY DATA

Physical Properties

Station	Sample Type	Sample Date	Sample Time	Lab Number	Sampling Method	Water Temperature (C)	Field pH (s.u.)	Lab pH (s.u.)	Field SC (umhos/cm)	Lab SC (umhos/cm)	Flow (cfs)	TDS (mg/l)	Turbidity (n.t.u.)	TSS (mg/l)	
CC-01	N	10/21/88		94633	GRAB			8.0		276					
CC-01	N	05/02/89		96915	GRAB			7.9		258	N/G	166			
CC-01	N	05/02/90	1715	103694	GRAB	6.0	7.11	6.9	261	277	N/G	108		2	U
CC-01	N	12/03/90	1250	109945	GRAB	1.0	8.07	7.8	277	280	N/G	183	0.30	1	U
CC-04	N	10/21/88		94632	GRAB			7.8		370					
CC-04	N	05/02/89		96916	GRAB			7.8		194	N/G	132			
CC-04	N	05/02/90	1550	103695	GRAB	6.0	7.41	7.0	392	153	N/G	103		38	
CC-04	N	12/03/90	1200	109946	GRAB	1.0	7.59	7.5	192	201	N/G	126	3.8	3	

Notes:
1) Sample type is defined as: N - Natural.
2) Data-quality analysis codes are defined as: U - Less than detection limits.
3) Blank values indicate parameters not determined.
4) Flow is defined as: NG - Not gaged.
5) Unless otherwise noted, all units are mg/l.

CABLE CREEK MINE GROUNDWATER QUALITY DATA
Physical Properties

Station	Sample Type	Sample Date	Sample Time	Lab Number	Sampling Method	Water Temperature (C)	Lab pH (s.u.)	Field pH (s.u.)	Lab SC (umhos/cm)	Field SC (umhos/cm)	TDS (mg/l)
CP-13	N	05/02/89		96914	N	4.0	8.2	7.78	183	182	144
CP-13	N	05/02/90	1700	103692	N	3.0	7.5	7.27	172	187	130
CP-13	N	12/03/90	1210	109947	N	11.0	7.7	7.4	165	161	113

Notes: 1) Sample types are defined as: N - Natural.
2) Data-quality analysis codes are defined as: U - Less than detection limits.
3) Blank values indicate parameters are not determined.
4) [illegible]s otherwise noted, units are mg/l.

CABLE CREEK MINE GROUNDWATER DATA
Dissolved Metals

Station	Sample Type	Sample Date	Sample Time	Arsenic	Cadmium	Copper	Iron	Lead	Mercury	Silver	Zinc
CP-13	N	05/02/89									
CP-13	N	05/02/90	1700	0.005 U	0.001 U	0.01 U	0.05 U	0.01 U	0.0004		0.01 U
CP-13	N	12/03/90	1210	0.005 U	0.001 U	0.02 U	0.05 U	0.01 U	0.0002 U	0.001 U	0.02 U

Notes: 1) Sample types are defined as: N - Natural.
2) Data-quality analysis codes are defined as: U - Less than detection limits.
3) Blank values indicate parameters are not determined.
4) Unless otherwise noted, units are mg/l.

CABLE CREEK MINE GROUNDWATER DATA
Anions Data

Station	Sample Date	Calcium	Magnesium	Potassium	Sodium	Total Alkalinity	Hardness	Chloride	Fluoride	Nitrate and Nitrite as N	Sulfate
CP-13	05/02/89	84	30	30	15	366	333	2	0.10	0.29	15
CP-13	05/02/90	27	5	26	5	122	88	2	0.07	0.08	18
CP-13	12/03/90	31	8	4	4	113	111	1 U	0.06	0.81	20

Notes: 1) Sample types are defined as: N - Natural.
2) Data-quality analysis codes are defined as: U - Less than detection limits.
3) Blank values indicate parameters are not determined.
4) Unless otherwise noted, units are mg/l.

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY SITE INVESTIGATION LOG SHEET

Mine/Site Name: GOLD COIN PA#: 12-004

Date: June 25, 1993 Time: 0930-1700

Field Team Leader: Tuesday, Pioneer

Sampling Personnel: Belanger, Pioneer
Clark, Pioneer

Visitors: None

Weather/Seasonality Observations: Sunny; warm; breezy; cool, wet spring and summer.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #25: WR-2 from below; #26: WR-1, north from above; #27: WR-1, south from above; #28: TP-1, east from above; #29: TP-1 center, and TP-2; #30: TP-1 west; #31: Adit #2, HMO; #32: TP-3 and SW-1 (Daly Lake); #33-#34: TP-3 and SW-1 closer. No video was taken.

General Comments/Observations (not covered specifically in attached Inventory Forms): Access to site by truck. New tailings berm made from old tailings. Ordered off the site by Jim Miller.

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Tailings revegetated well; waste rock is not well vegetated due to rocky, steep conditions and high sulfide content.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): GOLD COIN PA#: 12-004

Legal Description: T 5N ;R 13W ;Sec. 20 , SE1/4 NE1/4 ___1/4

County: DEERLODGE Mining District: SILVER LAKE

Latitude: N 46° 10' 31" Longitude: W 113° 14' 45"

Primary Drainage Basin and Code: Warm Springs Creek/17010201
Secondary Drainage Basin: Daly Gulch

USGS Quadrangle map name(s): Silver Lake

Mine Type/Commodities: Hardrock/Gold

Activity Status: Active___,Inactive/Exploration X ,Abandoned___.

Ownership status: Known YX N__; private/public? Private
Owner, Agent, or Contact(Include address and phone when available): Gold Coin Mining, Inc., P.O. Box 2822, Spokane, WA 99220. (509) 838-4447.

Relationship to other mines/sites in the area/district: Located between Georgetown Lake and Silver Lake; adjacent to Daly Lake. Many mines in the area; just across highway from Silver Lake Millsite, which received some ore from this site.

Regulatory Status (Activity by other agencies)? Hardrock permits? Past Reclamation Activities? N/A

General site features: Elevation 6640' , Slope 5°-10° ,
Aspect On south facing slope and also some east facing.

Land use: Mining___, Recreational X , Residential___, Urban___, Agricultural___, Other(Specify)

Area of disturbed/unvegetated lands? 34 acres.
Dimensions: 1,500 feet x 1,000 feet

Predominant vegetation types: Forested with scattered pines, open areas of sage and grasses.

Access: roads - good X ,poor___,4wd___,trail___.
Other logistical considerations (proximity to other sites).
Locked gates

Well logs within 1 mile radius; water rights 15 mi downstream (Attach MBMG Well Log Printout(s): There are 49 well logs within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). Site lies on hillside above Daly Gulch and across creek from Daly Lake. Daly Gulch flows into Warm Springs Creek which flows into Silver Lake. Country rock is dolomite limestone of the Hasmark Formation.

Mining/milling history, ore type/tenor, host rock, gangue: Gold discovered in 1898. By 1906, Gold Coin was in full production and by 1912, the district was dormant. Mine operated again from 1930 to 1940 and briefly in the 1950s to 1960s. Mill and principal mine workings are all on Red Fir Claim. Primary vein reported to be composed of quartz, pyrite, pyrrhotite, and chalcopyrite. Oxidized ore contained gold, silver, and malachite.

Mine Operation?
Shafts - Yes X, No ___, # 1, Comment Fenced; others up drain.
Adits - Yes X, No ___, # 3, Comment One caved; one open; one boarded but open
Pits - Yes ___, No X, # ___, Comment
Placers - Yes ___, No X, # ___, Comment
Other - Yes X, No ___, # 2, Comment Subsidence

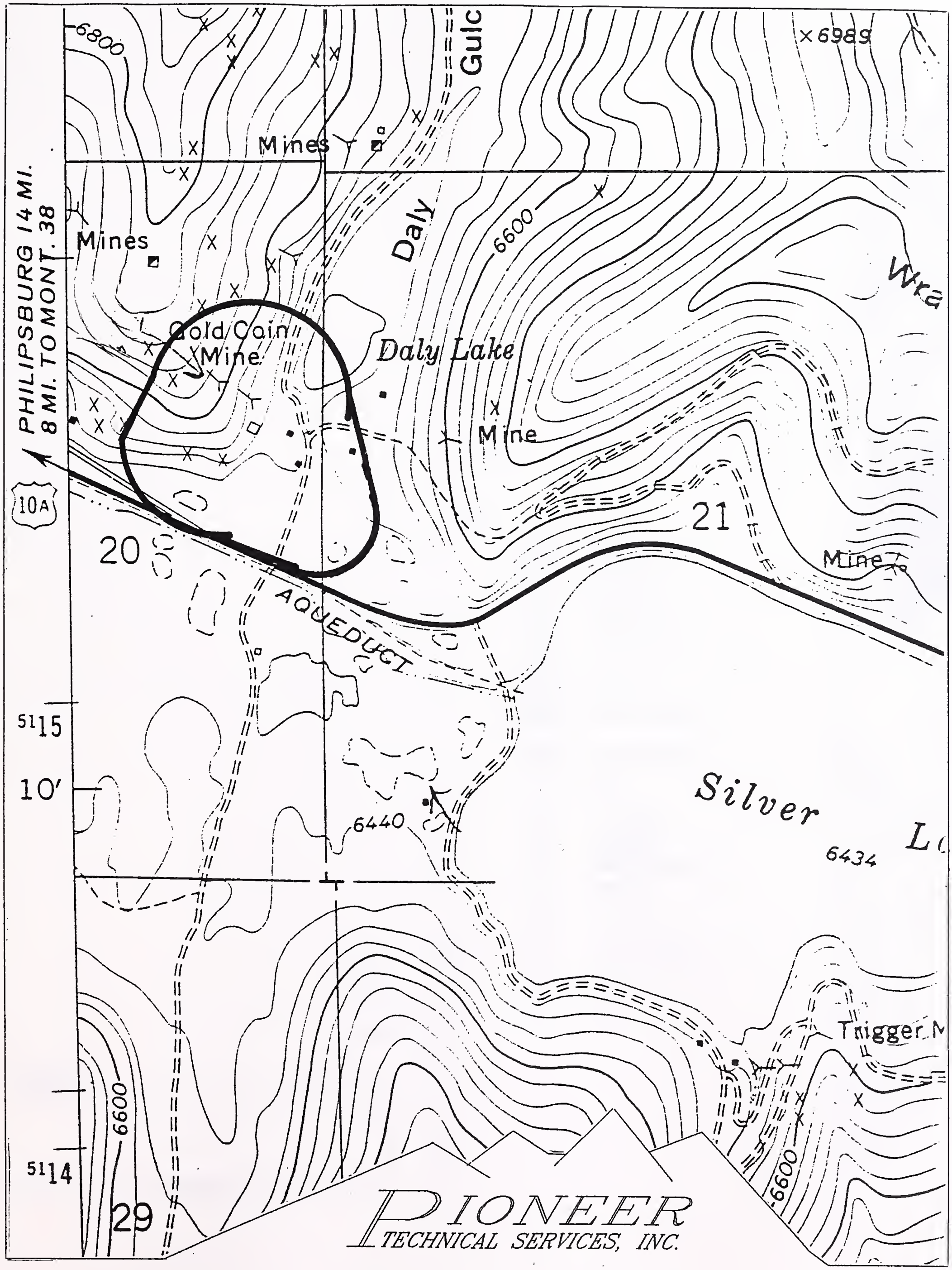
Mill Operation? Yes X, No ___. If yes answer the next three questions:

Period(s) of Operation: Unknown

Origin of Ore Milled - Custom Mill ___ Dedicated Mill X; Number and names of mines that supplied mill feed: Local, possibly Georgetown

Process? Hg-amalgam, CN$^-$ leach (vat, heap), floatation, smelting? May be CN- leach or floatation. In 1906, a 30-stamp mill with gold recovered by pan amalgamation. From 1930 to 1940, a cyanidation circuit was added and all preexisting tailings were run through.

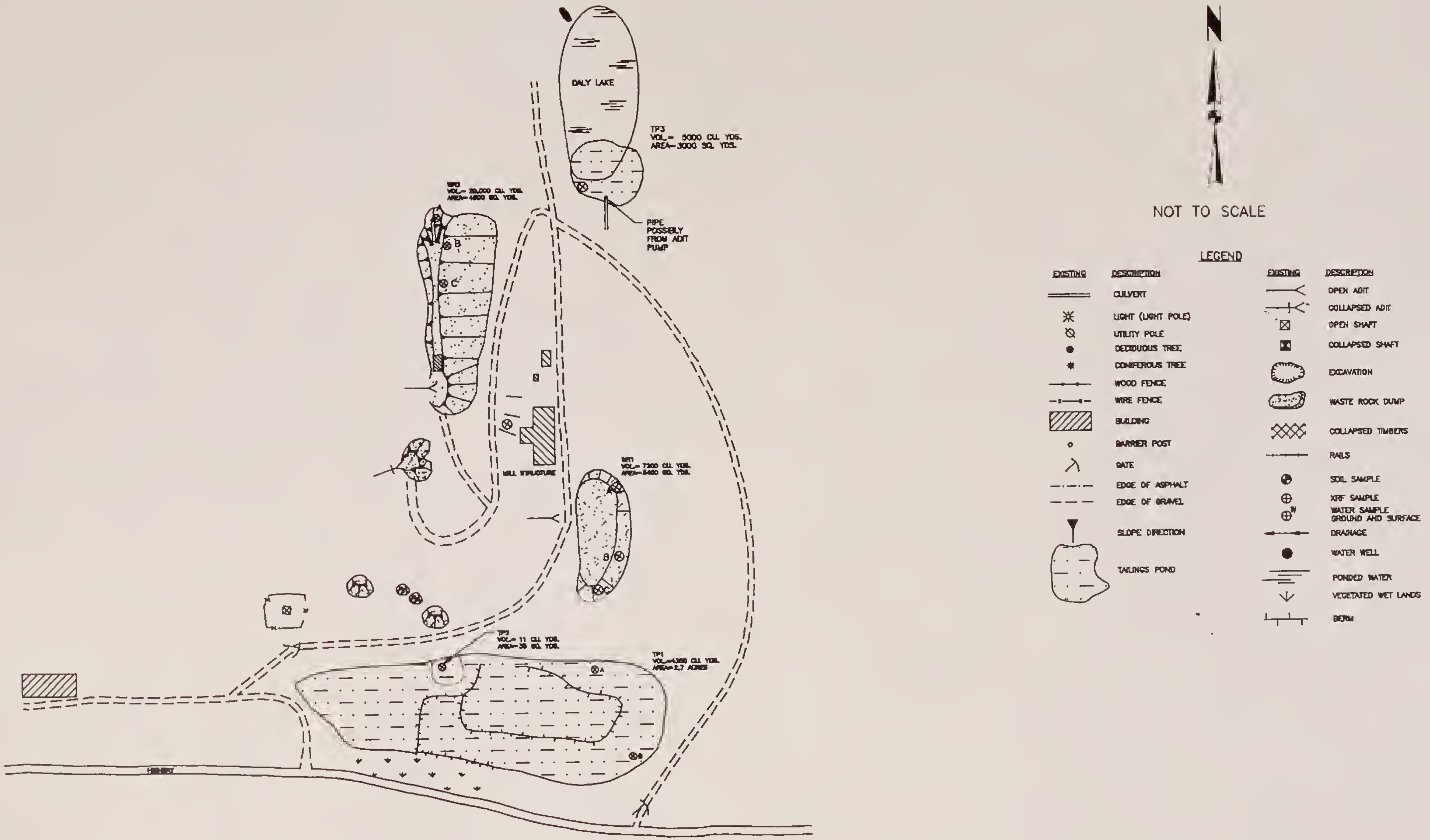
ll No.	Location	Depth	Yield	Static Water Level
M:52244	05N 13W 17	45.0	0.0	39.00
M:52243	05N 13W 17	40.0	20.0	10.00
M:52245	05N 13W 17 B	42.0	20.0	6.00
M:52246	05N 13W 17 B	77.0	20.0	58.00
M:52248	05N 13W 17 B	80.0	0.0	75.00
M:52249	05N 13W 17 B	110.0	30.0	0.00
M:52251	05N 13W 17 B	27.4	20.0	0.00
M:52252	05N 13W 17 B	260.0	60.0	0.00
M:52253	05N 13W 17 B	318.0	30.0	200.00
M:52250	05N 13W 17 B	180.0	15.0	82.00
M:52247	05N 13W 17 B	140.0	37.0	0.00
M:52254	05N 13W 17 BA	183.0	12.0	111.00
M:52255	05N 13W 17 BA	60.0	30.0	20.00
M:52256	05N 13W 17 BACB	35.0	10.0	25.00
M:52257	05N 13W 17 BACD	35.0	35.0	4.00
M:52258	05N 13W 17 BB	210.0	20.0	131.00
M:52259	05N 13W 17 BBA	47.0	8.0	0.00
M:52260	05N 13W 17 BBC	55.0	40.0	27.00
M:52261	05N 13W 17 BCC	420.0	12.0	250.00
M:52262	05N 13W 17 C	68.0	30.0	45.00
M:52263	05N 13W 17 CA	0.0	0.0	0.00
M:52264	05N 13W 17 CD	125.0	56.0	29.00
M:52265	05N 13W 18	49.0	30.0	13.00
M:52266	05N 13W 18 AACA	32.0	12.0	20.00
52267	05N 13W 19	100.0	15.0	80.00
52268	05N 13W 19	40.0	30.0	0.00
M:52269	05N 13W 19 B	30.0	15.0	3.00
M:52270	05N 13W 19 BA	55.0	30.0	6.00
M:52272	05N 13W 19 BC	46.0	40.0	0.00
M:52271	05N 13W 19 BC	37.0	40.0	5.00
M:52273	05N 13W 19 CAA	45.0	0.0	30.00
M:52274	05N 13W 19 CAC	60.0	100.0	0.00
M:52275	05N 13W 20	23.0	40.0	6.00
M:52276	05N 13W 20	48.0	30.0	10.00
M:52277	05N 13W 20	68.0	15.0	10.00
M:52278	05N 13W 20	20.0	20.0	3.00
M:52279	05N 13W 20 ADD	100.0	250.0	20.00
M:130150	05N 13W 20 B	58.0	15.0	30.00
M;130150	05N 13W 20 B	58.0	15.0	30.00
M:52280	05N 13W 20 BCA	30.0	100.0	6.00
M:52281	05N 13W 20 BDBD	50.0	100.0	9.00
M:52282	05N 13W 20 BDDB	30.0	100.0	8.00
M:52283	05N 13W 20 CB	40.0	25.0	10.00
M:52284	05N 13W 20 DD	39.0	30.0	22.00
M:52285	05N 13W 21 CAC	185.0	30.0	63.00
M:130152	05N 13W 21 CBA	40.0	25.0	13.00
M:130151	05N 13W 21 CBA	54.0	150.0	10.00
M:52286	05N 13W 21 CCCC	51.0	60.0	0.00
M:52289	05N 13W 30	0.0	0.0	55.00



PIONEER
TECHNICAL SERVICES, INC.

GOLD COIN, P.A. NO. 12-004

T05N, R13W, SECTION 20
SCALE: 1″ = 1000′



DRAWN JTP DATE 29 NOV 93
DESIGNED TPR JOB NO. 93-17
APPROVED WJB F.B. NO.

PIONEER TECHNICAL SERVICES, INC. BUTTE, MT.

TDH

THOMAS, DEAN & HOSKINS INC.
ENGINEERING CONSULTANTS
GREAT FALLS–BOZEMAN–KALISPELL MONTANA
SPOKANE WASHINGTON

MONTANA DEPT. OF STATE LANDS
HAZARDOUS MATERIAL INVENTORY

GOLD COIN PA# 12–004
SILVER LAKE DISTRICT DEER LODGE COUNTY

12-004.DWG SHEETS

SHEET NO.

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures / vessels sound, are runon/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): Mostly sandy, some silty clays.

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): One impoundment (TP-3) in Daly Lake, 6 feet deep; One unimpounded (TP-1), north of highway and south and east of WR-1, 3 feet deep originally; Both vegetated.

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): Dry, except tailings in Daly Lake.

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): Good, not migrating.

Comments on potential for mitigation: Self-vegetating.

SOURCE INVENTORY FORM

SAMPLERS: Tuesday, Belanger, Clark

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd³)	LOCATION/DESCRIPTION	CONTAIN-MENT	pH SU (D/S)*	RADIO-ACTIVITY (mR/HR)	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
WR-1A	WR	7,200	Across dirt road from boarded up adit, S of the mill; N end	None	6.8 (D)	0.02	12-004-WR-1	06/25/93 1812	T-Metals, ABA
WR-1B	WR		Across dirt road from boarded up adit, S of the mill; SE side	None	6.8 (D)	0.03			
WR-1C	WR		Across dirt road from boarded up adit, S of the mill; SW side	None	6.4 (D)	0.025			
WR-2A	WR	20,000	Dump located above and N of the mill; NW lobe	None	6.9 (D)	0.03			
WR-2B	WR		Dump located above and N of the mill; NE lobe	None	6.9 (D)	0.025			
WR-2C	WR		Dump located above and N of the mill, N of shack; center of dump	None	6.8 (D)	0.03			
TP-1A	TAIL	4,356	Past locked gate off of highway in marshy area; NE end, 0-22"	Good; by roadbed	6.0 (D)	0.035	12-004-TP-1	06/25/93 1623	T-Metals, ABA
TP-1B	TAIL		Past locked gate off of highway in marshy area; NW end, 0'-15"	Good; by roadbed	5.8 (D)	0.03			
TP-2	TAIL	11	Located inside bermed area (looked newer); W end, 0'-3'	Good; in new impoundment	6.8 (D)	0.02	N/A	N/A	XRF Analysis
TP-3A-1	TAIL	5,000	N of site, within Daly Lake; 0-6"	Good; in Daly Lake and impoundment	6.0 (D)	0.03	12-004-TP-3	06/25/93 1635	T-Metals, ABA
TP-3A-2	TAIL		N of site, within Daly Lake; 6"-30"	Good; in Daly Lake and impoundment	5.1 (D)	0.025			
TP-3A-3	TAIL		N of site, within Daly Lake; 30"-54"	Good; in Daly Lake and impoundment	5.6 (D)	0.035			
TP-3A-4	TAIL		N of site, within Daly Lake; 54"-66"	Good; in Daly Lake and impoundment	5.2 (D)	0.025			
TP-3A-5	TAIL		N of site, within Daly Lake; soil below tailings, 66"-72"	Good; in Daly Lake and impoundment	5.0 (D)	0.025	N/A	N/A	XRF Analysis

* D-Direct reading(Kelway Meter); S-Saturated Paste(Orion Meter)

Comments or deviations from SOPs: 12-004-WR-1 is composite of WR-1A through -1C and WR-2A through -2C. 12-004-TP-1 is composite of TP-1A and -1B. 12-004-TP-3 is composite of TP-3A-1 through TP-3A-4.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes___, No X , Number:____ Identification:____

Filled shafts: Yes___, No X , Number:____ Identification:____

Seeps/Springs: Yes___, No X , Number:____ Identification:____

Groundwater wells within 4 miles?: Yes X , No___;
Number of well logs: 283

Distance to nearest well used for drinking? 400 feet to a trailer house across the highway.

Sample types: Flowing adits (AD); filled shafts (SH);
Residential wells (RW); Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter), temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?
Definite____, Probable X , Possible____, Unlikely____.
Tailings (TP-1, -2, and -3) in groundwater.

Other observations/notes: N/A

GROUNDWATER INVENTORY FORM

SAMPLERS: ______

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SOURCE	FLOW* cfs/gpm	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Depth ft	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
No samples were taken.												

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): ______

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) an directions on sketch maps.

Flowing streams: Yes ____, No X, Name(s): ____

Dry streambeds: Yes X, No ____, Name(s): Daly Gulch

Other surface water: Yes X, No ____, Name(s)/Description: Daly Lake impoundment in Daly Gulch.

Waste materials within any floodplain: Yes X, No ____ Source ID(s): TP-1 in wetland by road; TP-3 in Daly Gulch impoundment.

Approximate Flood frequency? X 1 yr, ____ 10 yr, ____ 100 yr

Estimated seasonal flow of stream(s) (cfs)? N/A

High Flow: ____, Average Flow: ____

Distance between waste source(s) and nearest surface water body (ft)? WR-2 is approx. 200' from Daly Lake; tailings lie within Daly Lake.

Surface water draining onto or through waste sources: Yes X, No X,

Describe: Tailings are situated directly in Daly Lake.

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?) Silver Lake is approx. 0.5 mile northeast of site with drinking water supply, recreation, fisheries, and wetland.

Observed erosional/sedimentation/stream turbidity problems? Yes X, No ____, Distance downstream (ft)? N/A Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): Daly Lake seemed quite turbid, yet it was extremely low.

SURFACE WATER INVENTORY FORM

SAMPLERS: Belanger

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SAMPLE LOCATION	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Flow* cfs/gpm	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
SW-1	SW	Daly Lake (TP-3)	8.39	398	196	18.5	61	N/A	12-004-SW-1	06/25/93 1630	T-Metals, TDS, Hardness, Cl-, SO4, NO2/NO3

FLOW: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): ______

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO_3)

Presence of evaporative salt deposits? (ESD)

Discolored or turbid seepage? (SPG)

Presence of long filamentous algae in drainages, mosses in moist areas?

Presence of ferric hydroxide precipitates? (FEOX)

Presence of burned or stressed vegetation? (VEG)

pH ≤ 5.0 (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? 5 acres

Wetlands present: Yes X , No ___, Describe: Daly Lake is 200 feet from the site; wetland south of site along road.

Carbonate rocks/soils: Yes X , No ___, Describe: Abundant limestone

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10___; 10-30___; 30-100___; 100-300 X ; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or greater___; Comments

Nearest residence(ft or miles)? 400 feet

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Tuesday, Belanger, Clark

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH /MODERATE/LOW/NONE)
WR-1	FEOX	Dry	48,600	38,880	Yes	Low - lime cemented
WR-2	FEOX	Dry	40,500	32,400	Yes	Low - lime cemented
TP-1, -2	FEOX	Wet (swamp)	117,600	11,760	Yes	Low - vegetated
TP-3	FEOX	Partial	27,000	2,700	Yes	Low

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No_X_
Describe:______________________________

Population within 1 mile: 1-10___; 10-30_X_; 30-100___; 100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or greater___;
Comments______________________________

Evidence of recreational use on site: Yes_X_, No___, Describe: Campsites; hikers; horseback riders

Accessibility - Fences, warning signs, closed roads? Gated and locked roads; easy foot access; signs posted

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes___, No_X_, Comment___________
Wilderness Area - Yes___, No_X_, Comment___________
T&E Species Habitat - Yes_X_, No___, Comment Bald Eagle
Bat Habitat - Yes___, No_X_, Comment___________

Primary Drainage_X_; Secondary Drainage___; No Information___:

Riparian Habitat Quality - High___, Medium_X_, Low___
Wetlands Frontage - High___, Medium_X_, Low___
Fisheries Habitat and Species Classification - 2
Sport Fishery Classification - 4

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes_X_, No___, Number_2_, types and locations: One open adit; other adits are closed. The shaft is fenced, but accessible.

Hazardous structures: Yes_X_, No___, Number_1_, types and locations: Mill building

Unstable highwalls, pits, trenches, slopes: Yes___, No_X_, Number____, types and locations:______________________________

Unstable waste piles, impoundments, undercut banks: Yes____, No_X_, Number____, types and locations: Waste piles are at angle of repose.

Fire and/or Explosion hazards: Yes___, No_X_, Explain:______________________________

Bibliography

MBMG, Mines and Mineral Deposits of the Southern Flint Creek Range, Montana, Mining Districts-Gold Coin, Bulletin No. 81, Author Unknown, March 1972, p. 21.

MBMG, Well Log Database, September 8, 1993.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0, Prepared by Montana Natural Resource Information System, December 1989.

MDSL/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for the Gold Coin mine, Prepared by Northern Engineering and Testing, September 13, 1988.

MDSL/AMRB Files, Abandoned Mine Reclamation Portal Inventory Form for the Gold Coin mine, Prepared by Daphne Digrindakis, July 26, 1984.

MDSL/AMRB Files, Abandoned Mine Reclamation Portal Inventory Form for the Gold Coin mine, Prepared by Daphne Digrindakis, September 1982.

MDSL/AMRB Files, Abandoned Mine Lands National Inventory, Phase II Problem Area Data Sheet for the Gold Coin mine, Prepared by Tierra Buena Contracting, December 27, 1982.

USGS, Topographic Map, Silver Lake, Montana, 7 1/2 minute Quadrangle, 1971.

LABORATORY ANALYTICAL DATA

GOLD COIN
PA NO. 12-004

Gold Coin PA# 12-004
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER – TUESDAY
INVESTIGATION DATE: 06/25/93

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
12–004–TP–1	270	218 J	0.5 U	3.3	3.7	23.8	79700	1.75 J	392 J	8 J	13	16	80	0.276 U
12–004–TP–3	207	151 J	0.4 U	7.9	10.6	27.9	90100	0.943 J	401 J	12 J	20	6	309	21.09
12–004–WR–1	187	48.1 J	0.4 U	4.9	3.6	33.3	69900	0.729 J	387 J	8 J	21	15	68	NR
BACKGROUND	64	144	0.5 U	7.1	12.1	42.9	12800	0.025 J	597	13	27	5 J	92	NR

U – Not Detected; J – Estimated Quantity; X – Outlier for Accuracy or Precision; NR – Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	TOTAL SULFUR ACID BASE t/1000t	NEUTRAL. POTENT. t/1000t	SULFUR ACID BASE POTENT. t/1000t	SULFATE SULFUR %	PYRITIC SULFUR %	ORGANIC SULFUR %	PYRITIC SULFUR ACID BASE t/1000t	SULFUR ACID BASE POTENT. t/1000t
12–004–TP–1	<0.01	0	479	479	<0.01	<0.01	0.01	0	479
12–004–TP–1DUP	<0.01	0	472	472	<0.01	<0.01	0.01	0	472
12–004–TP–3	<0.01	0	172	172	<0.01	<0.01	0.01	0	172
12–004–WR–1	<0.01	0	924	924	<0.01	0.07	0.05	2.19	922

WATER MATRIX ANALYSES

Metals in Water
Results in ug/L

FIELD ID	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
12–004–SW–1	41.7	60.5	2.57 U	9.7 U	6.83 U	3.2	718	0.038 U	39.2	12.7 U	3.25	30.7 U	7.57 U	181

U – Not Detected; J – Estimated Quantity; X – Outlier for Accuracy or Precision; NR – Not Requested

Wet Chemistry
Results in mg/l

FIELD I.D.	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2–N	CYANIDE
12–004–SW–1	271	< 5.0	117	0.06	NR

LEGEND

TP1 – Composite of subsamples TP1A and 1B.
TP3 – Composite of subsamples 3A–1, 3A–2, 3A–3, and 3A–4.
WR1 – Composite of subsamples WR1A, 1B, 1C, 2A, 2B, and 2C.
BACKGROUND – From the Silver Lake Millsite (12–070–SS–1).
TP1DUP – Duplicate of sample 12–004–TP–1.
SW1 – Daly Lake.

XRF ANALYSIS RESULTS

GOLD COIN
PA NO. 12-004

MDSL AMRB/PIONEER 4/9/93

Mine Name: Gold Coin PA# 12-004
XRF Field Analyses
Results in PPM

XRF SAMPLE ID	CrHI	K	Ca	Ti	CrLO	Mn	Fe	Co	Cu	Zn	As	Sr
12-004-TP1-A		1512.56 *	72779.2			272.508 *	55291.6			91.2702 *	270.382	15.6515 *
12-004-TP1-B		1232.18 *	36851.4				99503.1			112.711 *	369.491	8.23254 *
12-004-TP2-A			180887				10491.3			52.8144 *	173.091	41.4985
12-004-TP3A-1		1035.97 *	75703			457.811 *	75217.6			195.643	267.1	21.3547
12-004-TP3A-2		1340.33 *	44775.1			455.434 *	118089	408.12 *		334.288	254.241	8.20146 *
12-004-TP3A-3		4394.8	125367	272.021 *		366.495 *	33513.2			462.815	139.365	46.7908
12-004-TP3A-4		1136.75 *	78931.1			490.215 *	70688.1			100.593 *	238.14	13.8308 *
12-004-TP3A-5		13660.9	41939.1	2102.92		466.514 *	34505.3			81.3858 *	123.669	114.797
12-004-TP-1-COMP		1634.32 *	99330.4			515.532 *	67198.8			103.773 *	270.152	18.7444 *
12-004-TP-3-COMP		2726.04	96227.3			547.188 *	76144.8			320.485	234.493	25.6998
12-004-WR1-A			112022			403.009 *	105368			63.844 *	132.953	30.0124
12-004-WR1-B			181091	112.817 *		416.89 *	31430.6			44.3015 *	166.987	60.236
12-004-WR1-C			172926			457.047 *	23596.5			58.6769 *	141.476	52.8512
12-004-WR2-A			181365			570.529 *	8013.67			61.7265 *	63.2783 *	27.3936
12-004-WR2-B			20393.4				202147	701.047 *		225.884	386.576	
12-004-WR2-C			117903			934.529 *	100416			135.108	376.809	11.9306 *
12-004-WR-1-COMP			156860			630.212 *	86373.7			102.729 *	272.701	26.169

	Zr	Hg	Mo	Pb	Rb	Cd	Sb	Ba	Ag	U	Th
12-004-TP1-A	23.4851							70.961			4.99491 *
12-004-TP1-B	11.4412						82.3444 *	251.842	598.281 *		
12-004-TP2-A	16.4184							40.3802 *	407.124 *		
12-004-TP3A-1	24.7693							46.7503 *			3.38826 *
12-004-TP3A-2	19.1832							120.441	518.487 *		4.60048 *
12-004-TP3A-3	34.8465							150.051			5.80728 *
12-004-TP3A-4	20.9781							166.803			
12-004-TP3A-5	128.993				54.7136			399.563			13.0722 *
12-004-TP-1-COMP	30.5478							135.628	462.002 *		
12-004-TP-3-COMP	25.3277							116.581	427.09 *		
12-004-WR1-A	7.93176 *		8.87874 *	36.7428 *				65.2566 *	415.677 *		
12-004-WR1-B	8.95234 *		8.16719 *	18.4941 *				36.638 *			3.91766 *
12-004-WR1-C	14.7385		6.48842 *	20.5933 *				37.3261 *			6.04479 *
12-004-WR2-A									313.047 *		
12-004-WR2-B	5.77432 *							20.3904 *	441.753 *		
12-004-WR2-C	6.35392 *						90.8373 *	167.404			
12-004-WR-1-COMP	9.43088 *							73.9654	432.931 *		3.32898 *

* – Estimated Quantity
$ – Unvalidated Data

ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS) SCORESHEET

GOLD COIN
PA NO. 12-004

MDSL AMRB/PIONEER 4/9/93

AIMSS SCORESHEET

SITE NAME: GOLD COIN
PA NUMBER: 12-004

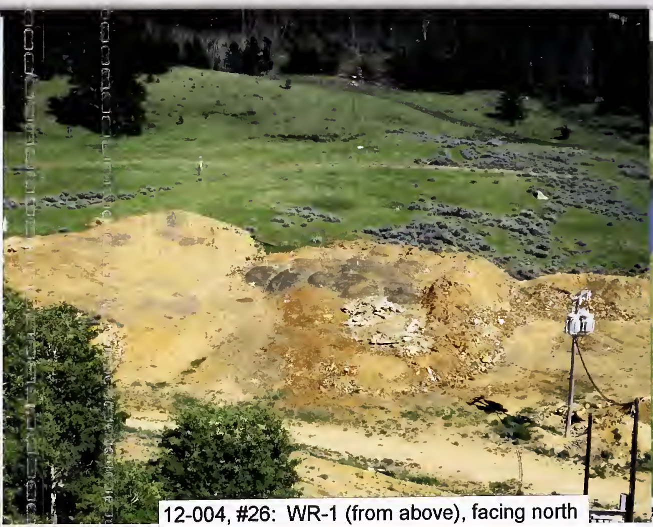
LINE NO.				
		GROUNDWATER PATHWAY		
1	GW - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
2		EXCEEDENCES		0
3A		CONTAINMENT		20
3B		GW DEPTH		20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B	400
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C	400
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	2.430
6	GW - TARGETS	WELLS - 1 MI. x 2.5		122.5
7		WELLS - 1 TO 4 MI		234
8		NEAREST WELL		10
9		TARGETS SCORE	LINES 6 + 7 + 8	366.5
10		**GROUNDWATER SCORE**	LINES 4 x 5 x 9	356238
		SURFACE WATER PATHWAY		
11	SW - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
12		EXCEEDENCES		0
13A		CONTAINMENT		20
13B		DISTANCE TO SW		20
13C		POTENTIAL TO RELEASE	LINES 13A x 13B	400
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C	400
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	3.457
16	SW - TARGETS	DRINKING WATER POP'N		977
17		IMPACTED DRAINAGE		0
18		WETLANDS		10
19		FISHERY		10
20		RECREATION		5
21		IRRIGATION/STOCK		0
22		T & E SPECIES HABITAT		5
23		TARGETS SCORE	SUM LINES 16 - 22	1007
24		**SURFACE WATER SCORE**	LINES 14 x 15 x 23	1392480
		AIR PATHWAY		
25	AIR - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
26A		CONTAINMENT		10
26B		DISTANCE TO POPULATION		20
26C		POTENTIAL TO RELEASE	LINES 26A x 26B	200
27		LIKELIHOOD SCORE	LINES 25 + 26C	200
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.050
29	AIR - TARGETS	POPULATION - 4 MILES		100
30		NEAREST RESIDENCE		10
31		WETLANDS		10
32		PARKS / WILDERNESS		0
33		T & E SPECIES HABITAT		5
34		TARGETS SCORE	SUM LINES 29 - 33	125
35		**AIR PATHWAY SCORE**	LINES 27 x 28 x 34	1250
		DIRECT CONTACT PATHWAY		
36	LIKELIHOOD OF EXPOSURE	OBSERVED EXPOSURE		50
37A		ACCESSIBILITY		5
37B		DISTANCE TO POPULATION		20
37C		POTENTIAL EXPOSURE	LINES 37A x 37B	100
38		LIKELIHOOD SCORE	LINES 36 + 37C	150
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.037
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE		10
41		NEAREST RESIDENCE		10
42		RECREATIONAL USE		2
43		TARGETS SCORE	SUM LINES 40 - 42	22
44		**DIRECT CONTACT SCORE**	LINES 38 x 39 x 43	122
45	**TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE**	(LINES 10 + 24 + 35 + 44) / 100,000		**17.50**

SITE NAME: GOLD COIN
PA NUMBER: 12-004

SITE SAFETY

LINE NO.				
1	THREAT	ACCESSIBILITY		5
2	HAZARDS	OPEN SHAFTS	100 EA.	100
3		OPEN ADITS	50 EA.	50
4		UNSTAB. HIWALLS / PITS	75 EA.	0
5		HAZ. STRUCTURES	40 EA.	40
6		EXPLOSIVES		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 - 7	190
9	TARGETS	POPULATION - 1 MILE		10
10		NEAREST RESIDENCE		10
11		RECREATIONAL USE		2
12		TARGETS SCORE	SUM LINES 9 - 11	22
13		**SITE SAFETY SCORE**	(LINES 1 x 8 x 12) / 1,000	**20.90**

12-004, #25: WR-2 (from below)

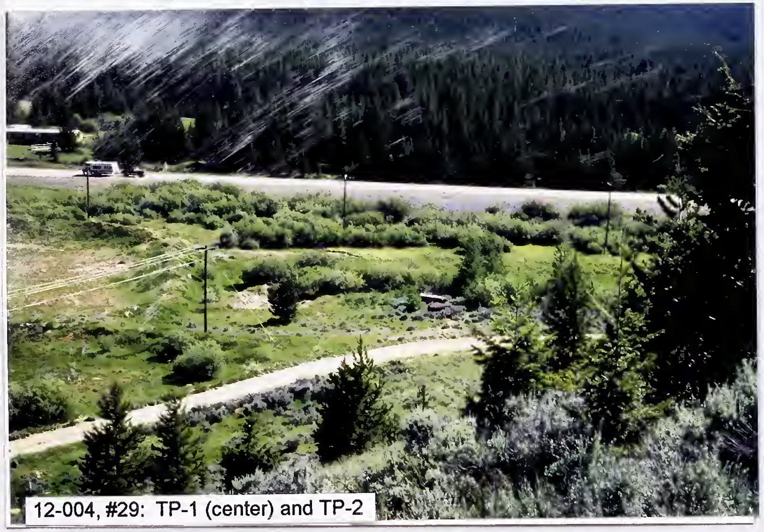


12-004, #26: WR-1 (from above), facing north

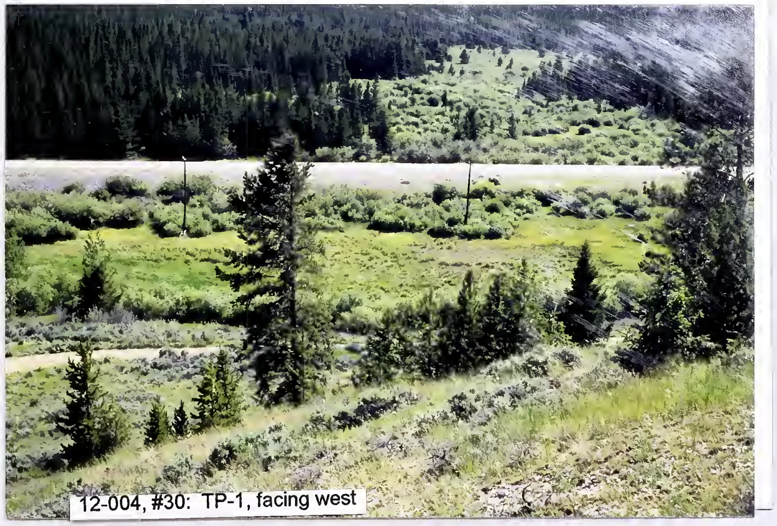
r view)

12-004, #27: WR-1 (from above), facing south

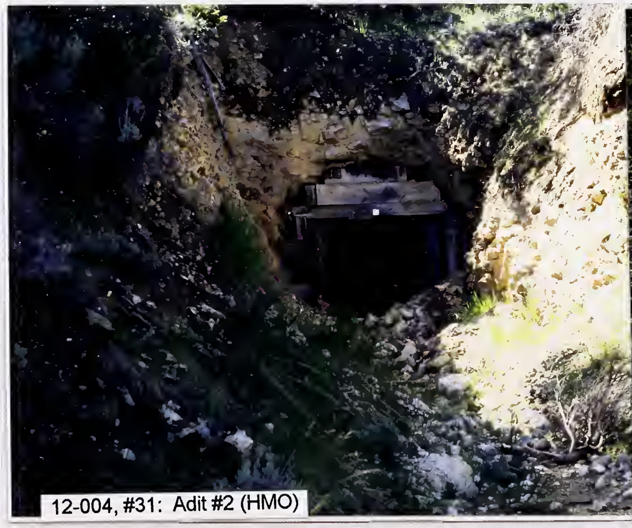
12-004, #28: TP-1 (from above), facing east



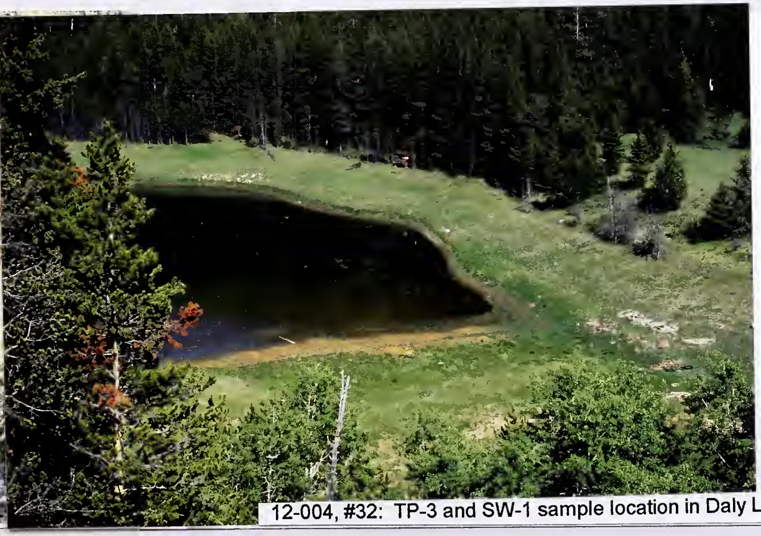
12-004, #29: TP-1 (center) and TP-2



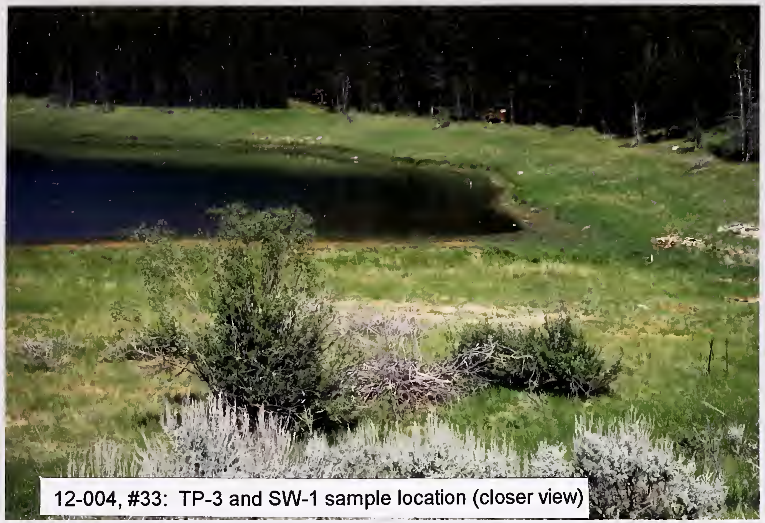
12-004, #30: TP-1, facing west



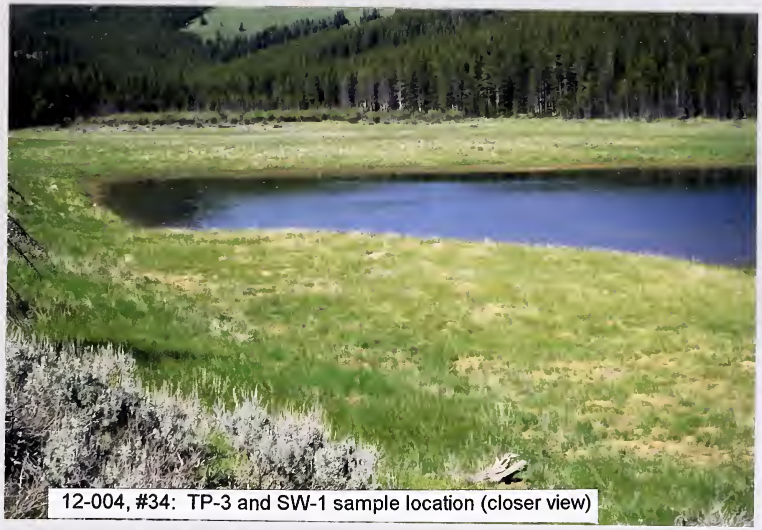
12-004, #31: Adit #2 (HMO)



12-004, #32: TP-3 and SW-1 sample location in Daly Lake



12-004, #33: TP-3 and SW-1 sample location (closer view)



12-004, #34: TP-3 and SW-1 sample location (closer view)

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY SITE INVESTIGATION LOG SHEET

Mine/Site Name: SILVER LAKE MILLSITE **PA#:** 12-070

Date: June 25, 1993 **Time:** 1040-1700

Field Team Leader: Bullock, Pioneer

Sampling Personnel: Flammang, Pioneer
Lasher, Pioneer

Visitors: Former mill owner (nearest resident)

Weather/Seasonality Observations: Sunny; calm; warm; cool, wet spring and summer.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #7: TP-2, looking west; #8: SW-1 in foreground, looking east toward ponds; #9: Mill area; #10: TP-1, looking east toward Silver Lake.
Video Tape No. 2

General Comments/Observations (not covered specifically in attached Inventory Forms): High mercury levels reported in XRF data are probably due to tungsten interferences.

Other Hazardous Materials/Substances Present: One 55 gal. barrel of hydraulic oil; one 55 gal. barrel of waste oil 1/3 full and leaking. Unknowns include: one 50 lb. box of white powder, 1/3 full, "American Cyanide Co." is printed on the box; one 15 gal. barrel, full; one sprayer, partially full; one 55 gal. drum, full, located by trailer, drum is in bad shape. A 500 gal. fuel storage tank contains a few inches of sludge.

General Comments on Potential Remedial Alternatives: Remove tailings from surface water; dispose of hazardous materials; raze structures; revegetate.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): SILVER LAKE MILLSITE PA#: 12-070

Legal Description: T 5N ;R 13W ;Sec. 21 , SW1/4 SW1/4 ___1/4

County: DEERLODGE Mining District: SILVER LAKE

Latitude: N 46° 09' 59" Longitude: W 113° 14' 22"

Primary Drainage Basin and Code: Flint Creek/17010202
Secondary Drainage Basin: Georgetown Lake
USGS Quadrangle map name(s): Silver Lake

Mine Type/Commodities: Mill/Wulferlite, Scheelite
Activity Status: Active___,Inactive/Exploration X ,Abandoned___.

Ownership status: Known YX N__; private/public? Private/Public
Owner, Agent, or Contact(Include address and phone when available): Prospect Construction, Philipsburg, MT 59858; Evelyn Hardtla, 1321 West Park, Anaconda, MT 59711. (406) 563-5136; Y.T. Timber, Inc., P.O. Box 5405, Boise, ID 83705; Frank Gustafson, 13301 Hwy 1, Anaconda, MT 59711. (406) 563-2604; First Security Bank of Anaconda, c/o Federal Deposit Insurance Corp., 707 17th Street, Suite 3000, Denver, CO 80202; William Montgomery, 1818 West Park, Anaconda, MT 59711. (406) 563-5374 or 563-6057; Deerlodge National Forest.

Relationship to other mines/sites in the area/district: Brief relation with Gold Coin Mine in the mid-1980's.

Regulatory Status (Activity by other agencies)? Hardrock permits?
Past Reclamation Activities? N/A

General site features: Elevation 6440', Slope 3°,
Aspect West

Land use: Mining___, Recreational X , Residential X , Urban___,
Agricultural___, Other(Specify)___

Area of disturbed/unvegetated lands? 2-2.5 acres.
Dimensions:___

Predominant vegetation types: Lodgepole pine, willows, grasses

Access: roads - good X ,poor___,4wd___,trail___.
Other logistical considerations (proximity to other sites).___

Well logs within 1 mile radius; water rights 15 mi downstream (Attach MBMG Well Log Printout(s): There are 43 well logs within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). Site is located near the western edge of Silver Lake with general drainage direction towards Georgetown Lake, which is located approx. 3/4 mile to the west. Surface water runoff for the site appears to be contained in a small pond area. Groundwater flow probably trends towards Georgetown Lake. Limestone and intrusive appear to underlie the site.

Mining/milling history, ore type/tenor, host rock, gangue: Primarily used for washing/floatation of wulferlite and scheelite, although the former owner reported that limited Hg-amalgam bench tests were conducted.

Mine Operation?
Shafts - Yes___, No X, # ___, Comment___
Adits - Yes___, No X, # ___, Comment___
Pits - Yes___, No X, # ___, Comment___
Placers - Yes___, No X, # ___, Comment___
Other - Yes___, No X, # ___, Comment___

Mill Operation? Yes X, No___. If yes answer the next three questions:

Period(s) of Operation: From the 1960's intermittently through the 1980's

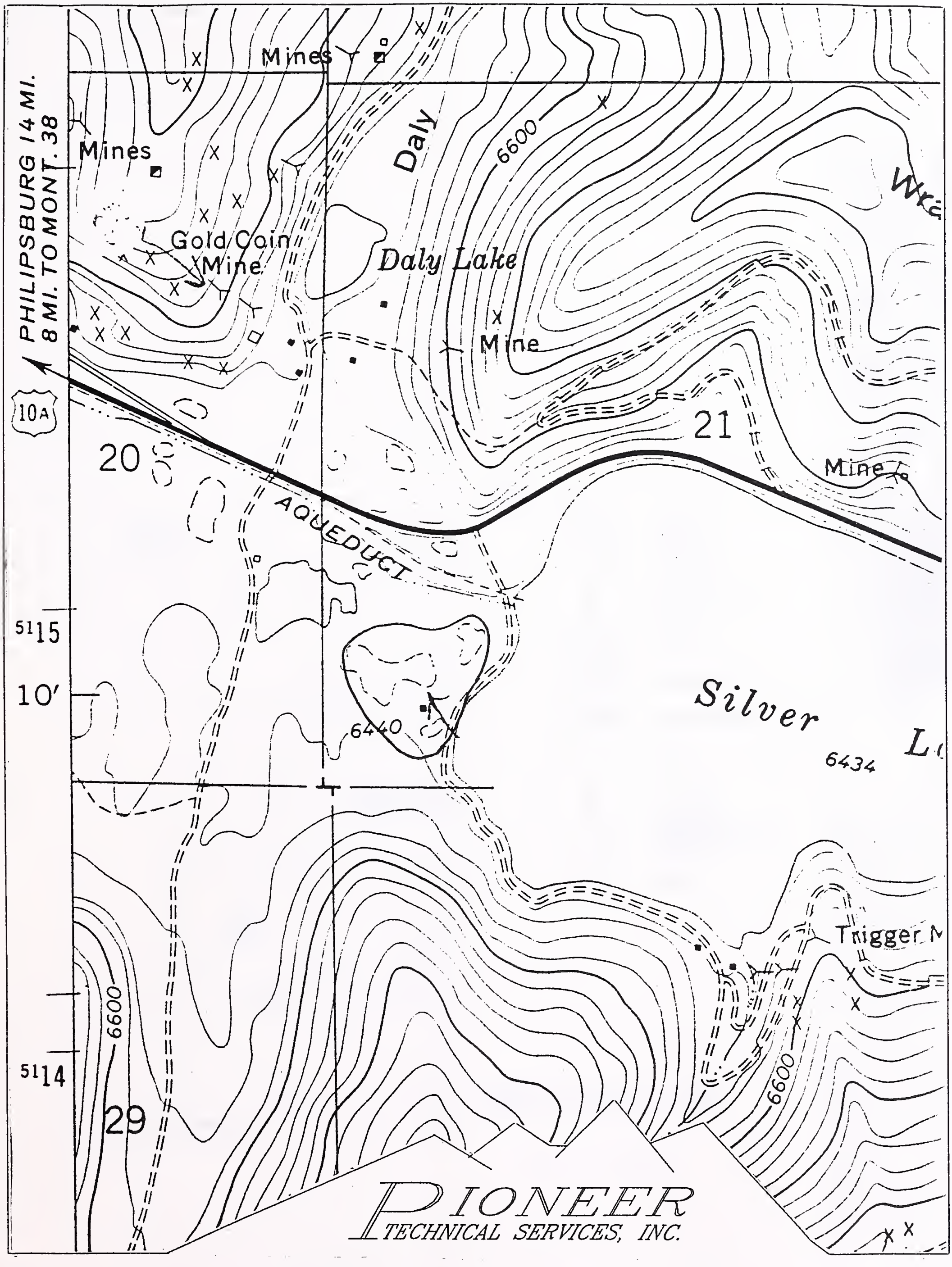
Origin of Ore Milled - Custom Mill X Dedicated Mill___; Number and names of mines that supplied mill feed: Gold Coin Mine; limited Scheelite mined somewhere near Philipsburg.

Process? Hg-amalgam, CN^- leach (vat, heap), floatation, smelting? Floatation and mercury amalgam

Montana Bureau of Mines and Geology
Water Well Log Data

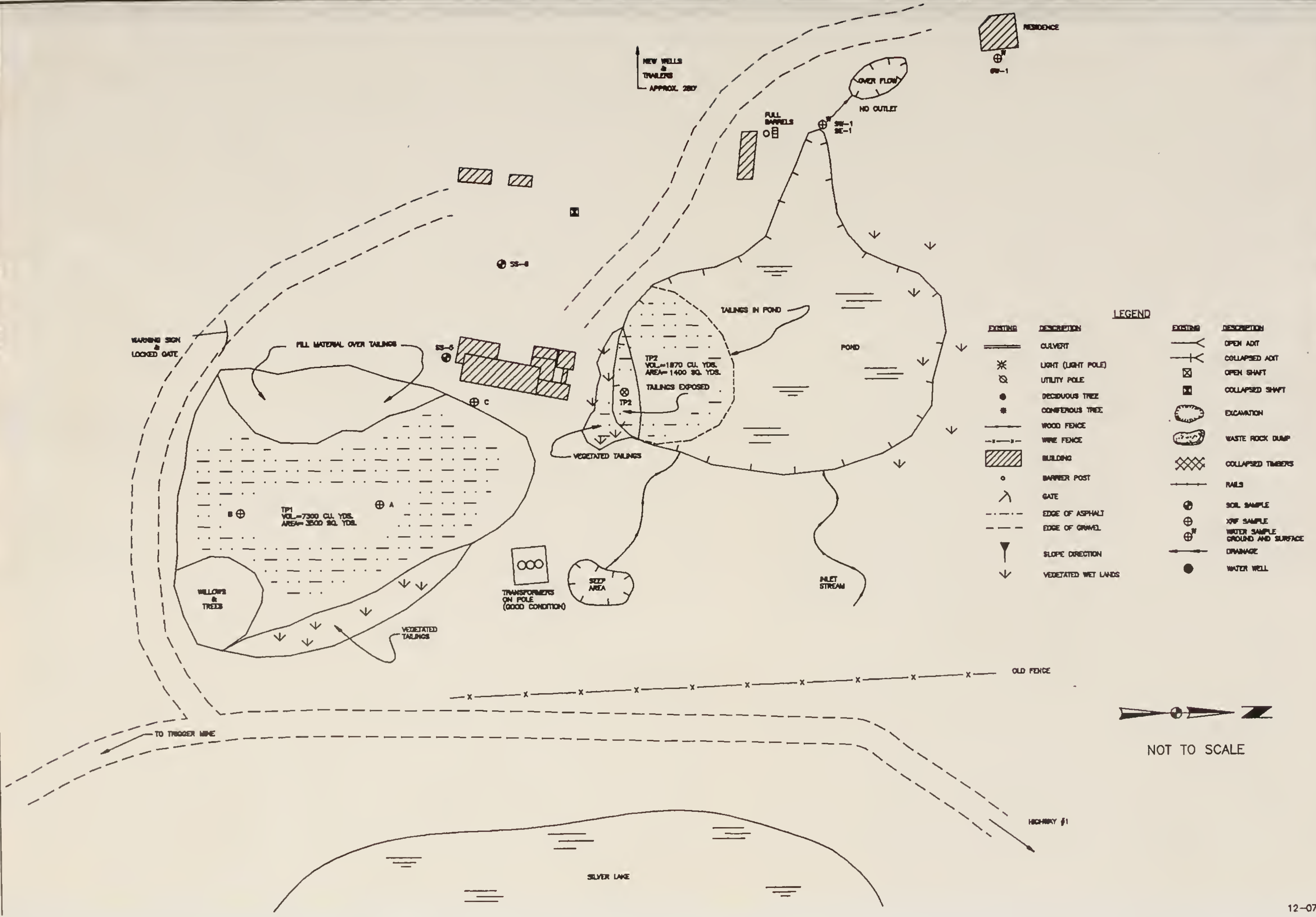
10/22/1993

Well No.	Location	Depth	Yield	Static Water Level
M:52244	05N 13W 17	45.0	0.0	39.00
M:52243	05N 13W 17	40.0	20.0	10.00
M:52245	05N 13W 17 B	42.0	20.0	6.00
M:52246	05N 13W 17 B	77.0	20.0	58.00
M:52248	05N 13W 17 B	80.0	0.0	75.00
M:52249	05N 13W 17 B	110.0	30.0	0.00
M:52251	05N 13W 17 B	27.4	20.0	0.00
M:52252	05N 13W 17 B	260.0	60.0	0.00
M:52253	05N 13W 17 B	318.0	30.0	200.00
M:52250	05N 13W 17 B	180.0	15.0	82.00
M:52247	05N 13W 17 B	140.0	37.0	0.00
M:52254	05N 13W 17 BA	183.0	12.0	111.00
M:52255	05N 13W 17 BA	60.0	30.0	20.00
M:52256	05N 13W 17 BACB	35.0	10.0	25.00
M:52257	05N 13W 17 BACD	35.0	35.0	4.00
M:52258	05N 13W 17 BB	210.0	20.0	131.00
M:52259	05N 13W 17 BBA	47.0	8.0	0.00
M:52260	05N 13W 17 BBC	55.0	40.0	27.00
M:52261	05N 13W 17 BCC	420.0	12.0	250.00
M:52262	05N 13W 17 C	68.0	30.0	45.00
M:52263	05N 13W 17 CA	0.0	0.0	0.00
M:52264	05N 13W 17 CD	125.0	56.0	29.00
M:52275	05N 13W 20	23.0	40.0	6.00
M:52276	05N 13W 20	48.0	30.0	10.00
M:52277	05N 13W 20	68.0	15.0	10.00
52278	05N 13W 20	20.0	20.0	3.00
M:52279	05N 13W 20 ADD	100.0	250.0	20.00
M:130150	05N 13W 20 B	58.0	15.0	30.00
M;130150	05N 13W 20 B	58.0	15.0	30.00
M:52280	05N 13W 20 BCA	30.0	100.0	6.00
M:52281	05N 13W 20 BDBD	50.0	100.0	9.00
M:52282	05N 13W 20 BDDB	30.0	100.0	8.00
M:52283	05N 13W 20 CB	40.0	25.0	10.00
M:52284	05N 13W 20 DD	39.0	30.0	22.00
M:52285	05N 13W 21 CAC	185.0	30.0	63.00
M:130152	05N 13W 21 CBA	40.0	25.0	13.00
M:130151	05N 13W 21 CBA	54.0	150.0	10.00
M:52286	05N 13W 21 CCCC	51.0	60.0	0.00
M:5382	05N 13W 22 ACDC	0.0	0.0	0.00
M:52287	05N 13W 22 D	50.0	30.0	22.00
M:128606	05N 13W 27 BBD	40.0	30.0	12.00
M:128608	05N 13W 27 BDD	82.0	25.0	30.00
M:128607	05N 13W 27 BDD	60.0	35.0	17.00



PIONEER
TECHNICAL SERVICES, INC.

SILVER LAKE MILL, P.A. NO. 12–070
T05N, R13W, SECTION 21
SCALE: 1″ = 1000′



DRAWN JTP DATE 6 OCT 93
DESIGNED TPR JOB NO. 93-17
APPROVED WJB F.B. NO.

PIONEER

THOMAS, DEAN & HOSKINS INC.
ENGINEERING CONSULTANTS
GREAT FALLS–BOZEMAN–KALISPELL MONTANA
SPOKANE WASHINGTON

TD&H

MONTANA DEPT. OF STATE LANDS
HAZARDOUS MATERIAL INVENTORY

SILVER LAKE MILLSITE PA# 12–070
SILVER LAKE DISTRICT DEER LODGE COUNTY

SHEET NO.

12–070.DWG SHEETS

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures / vessels sound, are runon/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): Medium/fine sand

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): Depth of ponds are approx. 6 feet; no significant color change.

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): Surface is moist due to precipitation; 3'-2' dry, wet below.

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): Tailings are semi-confined in a closed basin, spilling into a small pond.

Comments on potential for mitigation: Removal from surface water and encapsulation, if deemed necessary.

SOURCE INVENTORY FORM

SAMPLERS: Bullock, Lasher

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd^3)	LOCATION/DESCRIPTION	CONTAIN-MENT	pH SU (D/S)*	RADIO-ACTIVITY (mR/HR)	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
TP-1A-A	TAIL	7,300	North side of pond; 0'-3', white moist sand	Closed basin	6.4 (D)	0.03	12-070-TP-1	06/25/93 1645	T-Metals, ABA, Cl-
TP-1A-B	TAIL		North side of pond; 3'-6', light brown wet sand	Closed basin	5.6 (D)	0.04			
TP-1A-C	TAIL		North side of pond; 6'-7', dark brown wet sand	Closed basin	5.8 (D)	0.03			
TP-1B-A	TAIL		South side of pond; 0'-3', white moist sand	Closed basin	6.2 (D)	0.04			
TP-1B-B	TAIL		South side of pond; 3'-6', light gray wet sand	Closed basin	5.8 (D)	0.03			
TP-1B-C	TAIL		South side of pond; 6'-8', light gray wet sand	Closed basin	6.0 (D)	0.04			
TP-1C	TAIL	N/A	Sump drain from mill into TP-1	N/A	4.8 (D)	0.04			
TP-2A	TAIL	1,870	Tails spilling into pond; 0'-2', white moist sand	Pond	6.5 (D)	0.03	12-070-TP-2	06/25/93 1645	T-Metals, ABA, Cl-
TP-2B	TAIL		Tails spilling into pond; 2'-4', light gray wet sand	Pond	6.0 (D)	0.03			
SS-1	BKGRND	N/A	Background soil	N/A	N/A	N/A	12-070-SS-1	06/29/93 1220	T-Metals
SS-2	SOIL	N/A	Underlying soil below TP-1A	N/A	5.1 (D)	0.04			
SS-4	SOIL	N/A	Underlying soil below TP-2	N/A	5.7 (D)	0.04			
SS-5	SOIL	N/A	Soil near south wall of mill building	N/A	6.6 (D)	0.04			
SS-6	SOIL	N/A	Surface soil in the loading/parking area	N/A	6.6 (D)	0.05			

*D-Direct reading(Kelway Meter); S-Saturated Paste(Orion Meter)

Comments or deviations from SOPs: 12-070-TP-1 is composite of TP-1A-A through -1A-C, and TP-1B-A through -1B-C. 12-070-TP-2 is composite of TP-2A and -2B.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes___, No_X_, Number:____ Identification:______________

Filled shafts: Yes___, No_X_, Number:____ Identification:______________

Seeps/Springs: Yes_X_, No___, Number:_2_ Identification:_Seeps upgradient from Silver Lake_

Groundwater wells within 4 miles?: Yes_X_, No___;
Number of well logs:_303_

Distance to nearest well used for drinking?_250 feet_

Sample types: Flowing adits (AD); filled shafts (SH); Residential wells (RW); Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter), temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?
Definite____, Probable____, Possible_X_, Unlikely____.
Tailings material is in contact with surface water that infiltrates into the ground in the pond discharge area.

Other observations/notes:_N/A_

GROUNDWATER INVENTORY FORM

SAMPLERS: Bullock, Flammang

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SOURCE	FLOW* cfs/gpm	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Depth ft	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
GW-1	RW	Residential well 250 feet northwest of site	N/A	8.22	260	204	10.5	90	57	12-070-GW-1	06/25/93 1315	Dissolved metals, TDS, Hardness, SO4, NO2/NO3
GW-2	RW	QA duplicate of GW-1	N/A	8.22	260	204	10.5	90	57	12-070-GW-2	06/25/93 1315	Dissolved metals, TDS, Hardness, SO4, NO2/NO3

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): Well was used to water the lawn for the entire morning prior to sampling; therefore, no purging was necessary other than a few minutes to flush the tap and pipes.

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes____, No_X_, Name(s):____

Dry streambeds: Yes____, No_X_, Name(s):____

Other surface water: Yes_X_, No___, Name(s)/Description: Pond with tailings north of the main tailings pond (TP-1); seepage from Silver Lake keeps pond flooded and there is no outlet; therefore, water inflow infiltrates into the ground.

Waste materials within any floodplain: Yes_X_, No___ Source ID(s): TP-2 in pond

Approximate Flood frequency?___1 yr,___10 yr,___100 yr

Estimated seasonal flow of stream(s) (cfs)? No flowing water
High Flow:____, Average Flow:____

Distance between waste source(s) and nearest surface water body (ft)? 0 feet

Surface water draining onto or through waste sources: Yes____, No_X_,
Describe:____

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?) Fishery, recreation, irrigation, stock watering, drinking water in Georgetown Lake.

Observed erosional/sedimentation/stream turbidity problems? Yes____, No_X_, Distance downstream (ft)?____ Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): N/A

SURFACE WATER INVENTORY FORM

SAMPLERS: Flammang

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SAMPLE LOCATION	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Flow* cfs/gpm	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
SW-1	SW	West side of pond near over flow	8.74	200	230	14.2	NM	0 gpm	12-070-SW-1	06/25/93 1330	T-Metals, TDS, Hardness, Cl, SO4, NO2/NO3
SE-1	SE	West side of pond near over flow	N/A	N/A	N/A	N/A	N/A	N/A	12-070-SE-1	06/25/93 1330	T-Metals

FLOW: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): NM = No measurement due to alkalinity kit not working properly.

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO_3)

Presence of evaporative salt deposits? (ESD)

Discolored or turbid seepage? (SPG)

Presence of long filamentous algae in drainages, mosses in moist areas?

Presence of ferric hydroxide precipitates? (FEOX)

Presence of burned or stressed vegetation? (VEG)

pH ≤ 5.0 (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? Approx. 2 acres

Wetlands present: Yes X , No ___, Describe: One acre in pond area

Carbonate rocks/soils: Yes X , No ___, Describe: Indicated by high pH material; tailings are composed of limestone with an intrusive.

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10___; 10-30___; 30-100___; 100-300 X ; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or greater___; Comments___

Nearest residence(ft or miles)? 250 feet

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Bullock, Flammang, Lasher

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH /MODERATE/LOW/NONE)
TP-1	None	Moist	31,500	31,500	Yes	Low
TP-2	None	Moist	12,600	12,600	Yes	Low

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No_X_, Describe:____________________

Population within 1 mile: 1-10___; 10-30_X_; 30-100___; 100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or greater___; Comments____________________

Evidence of recreational use on site: Yes___, No_X_, Describe:____________________

Accessibility - Fences, warning signs, closed roads? _Site is fenced with signs posted._

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes___, No_X_, Comment____________
Wilderness Area - Yes___, No_X_, Comment____________
T&E Species Habitat - Yes_X_, No___, Comment_Bald Eagle_
Bat Habitat - Yes___, No_X_, Comment____________

Primary Drainage_X_; Secondary Drainage___; No Information___:

Riparian Habitat Quality - High___, Medium_X_, Low___
Wetlands Frontage - High___, Medium_X_, Low___
Fisheries Habitat and Species Classification - _2_
Sport Fishery Classification - _4_

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes___, No_X_, Number____, types and locations:____________________

Hazardous structures: Yes_X_, No___, Number_4_, types and locations:_Mill structures, sheds, and a trailer_

Unstable highwalls, pits, trenches, slopes: Yes___, No_X_, Number____, types and locations:____________________

Unstable waste piles, impoundments, undercut banks: Yes____, No_X_, Number____, types and locations:____________________

Fire and/or Explosion hazards: Yes_X_, No___, Explain:_Mill structures and sheds, and possibly reagents_

Bibliography

Bullock, Bill, Personal Communication with the Former Mill Owner at the GW-1 Residence, July 25, 1993.

MBMG, Well Log Database, September 8, 1993.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0, Prepared by Montana Natural Resource Information System, December 1989.

MDSL/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for the Silver Lake Millsite, Prepared by Northern Engineering and Testing, August 26, 1988.

USGS, Topographic Map, Silver Lake, Montana, 7 1/2 minute Quadrangle, 1971.

LABORATORY ANALYTICAL DATA

SILVER LAKE MILLSITE
PA NO. 12-070

Silver Lake Millsite PA# 12−070
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER − BULLOCK
INVESTIGATION DATE: 06/25/93

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
12−070−SE−1	7	119 J	0.9	4.9	10.5	53.8	8850	0.206 J	157 J	11 J	41	6 U	106	NR
12−070−TP−1	6	68.4 J	1.4	1.7	3.4	37.2	3100	0.275 J	364 J	9 J	67	3 U	109	NR
12−070−TP−2	3 U	127 J	0.5 U	1.2 U	1.2	8.6	786	0.133 J	103 J	5 J	5	4 U	37	NR
BACKGROUND	64	144	0.5 U	7.1	12.1	42.9	12800	0.025 J	597	13	27	5 J	92	NR

U − Not Detected; J − Estimated Quantity; X − Outlier for Accuracy or Precision; NR − Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	TOTAL SULFUR ACID BASE t/1000t	NEUTRAL. POTENT. t/1000t	SULFUR ACID BASE POTENT. t/1000t	SULFATE SULFUR %	PYRITIC SULFUR %	ORGANIC SULFUR %	PYRITIC SULFUR ACID BASE t/1000t	SULFUR ACID BASE POTENT. t/1000t
12−070−TP−1	<0.01	0	855	855	<0.01	0.18	<0.01	5.62	849
12−070−TP−2	<0.01	0	919	919	<0.01	0.02	<0.01	0.62	919

WATER MATRIX ANALYSES

Metals in Water
Results in ug/L

FIELD ID	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
12−070−GW−1	0.98 U	18	2.57 U	9.7 U	6.83 U	4.77	11.8 U	0.1	4.4	12.7 U	0.38 U	30.7 U	7.57 U	88.2
12−070−GW−2	1.01	17.4	2.57 U	9.7 U	6.83 U	5.8	11.8 U	0.059	4.08 U	12.7 U	0.59	30.7 U	7.57 U	86.9
12−070−SW−1	2.93	23.5	2.57 U	9.7 U	6.83 U	2.43	79	0.038 U	4.08 U	12.7 U	1.41	30.7 U	7.57 U	87.8

U − Not Detected; J − Estimated Quantity; X − Outlier for Accuracy or Precision; NR − Not Requested

Wet Chemistry
Results in mg/l

FIELD I.D.	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2−N	CYANIDE
12−070−GW−1	124	< 5.0	9	0.13	< 0.00
12−070−GW−2	137	< 5.0	9	0.12	< 0.00
12−070−SW−1	125	< 5.0	9	< 0.05	< 0.00

LEGEND

SE1 − North side of pond near overflow.
TP1 − Composite of subsamples TP1A−A, 1A−B, 1A−C, 1B−A, 1B−B, and 1B−C.
TP2 − Composite of subsamples TP2A and 2B.
BACKGROUND − From Silver Lake Millsite (12−070−SS−1).
GW1 − Residential well 250' Northwest of site.
GW2 − QA duplicte of sample 12−070−GW−1.
SW1 − Same as sample SE1.

XRF ANALYSIS RESULTS

SILVER LAKE MILLSITE
PA NO. 12-070

MDSL AMRB/PIONEER 4/9/93

Mine Name: Silver Lake Millsite PA#12-070
XRF Field Analyses
Results in PPM

XRF SAMPLE ID	CrHI	K	Ca	Ti	CrLO	Mn	Fe	Co	Cu	Zn	As	Sr
12-070-SS-1		20991.6	36422.9				39241.3		64.1379 *	75.9256 *		58.5227
12-070-SS-2		9008.22	17260.1	1958.27		312.078 *	22660.2	252.501 *		160.74 *	62.7429 *	148.439
12-070-SS-4		11450.5	17219.2	2292.07			22612.8			127.663 *		209.692
12-070-SS-5		4450.05	140747	1253.49			18161		149.178 *	190.157	47.3633 *	185.43
12-070-SS-6		6294.14	106388	1255.16			49758.7			91.6698 *	64.3125 *	202.95
12-070-TP1A-A			250313	120.901 *			730.665			145.296 *		150.732
12-070-TP1A-B			248709	139.105 *			995.425			170.269 *	57.7562 *	159.561
12-070-TP1A-C			220212	384.331 *		580.508 *	4455.22			68.3508 *	34.4863 *	325.995
12-070-TP1B-A			244671				992.465			78.3543 *		158.073
12-070-TP1B-B			227470	260.595 *			2430.71		106.553 *	503.063		139.802
12-070-TP1B-C		6848.1	186407	754.414		592.59 *	7479.91		103.415 *	546.978		185.783
12-070-TP1-C		3727.37	100259	1821.56		712.937 *	128688		5626.17	4877.12	380.625 *	115.133
12-070-TP2A-A			242134				536.605 *				35.1061 *	178.518
12-070-TP2A-B			259023				1126.03			121.101 *		175.004
12-070-TP-1-COMP		1611.57 *	211376	360.115 *			3825.71		100.926 *	302.547	34.4851 *	187.757
12-070-TP-2-COMP			255924	155.523 *			1270.44			124.768 *		166.259

	Zr	Hg	Mo	Pb	Rb	Cd	Sb	Ba	Ag	U	Th
12-070-SS-1	131.263			308.98	194.877		48.0259 *	324.876			11.9438 *
12-070-SS-2	141.412				76.4913			308.793			19.499 *
12-070-SS-4	197.133				79.2722			403.423	84.7158 *		17.4397 *
12-070-SS-5	71.4371	37.4852 *		58.5338 *	20.8703 *		46.1245 *	133.413	114.625 *		9.16816 *
12-070-SS-6	121.639			59.5286 *	33.0784 *			266.413			6.50278 *
12-070-TP1A-A	9.01425 *	387.083						70.3551	146.761 *		5.77843 *
12-070-TP1A-B	6.6955 *	293.921						73.989	88.6126 *		9.86966 *
12-070-TP1A-C	26.7808	190.19			11.1284 *			32.1306 *			9.56787 *
12-070-TP1B-A	7.68294 *	211.356				159.824 *					8.34679 *
12-070-TP1B-B	17.5095	895.453						115.116	159.557 *		12.8255 *
12-070-TP1B-C	68.6527	366.765		234.732	48.2981		50.7482 *	121.987	85.2345 *		17.296 *
12-070-TP1-C	815.244	795.448		4433.54	29.4875 *		1576.57	722.874	415.056 *		47.6207
12-070-TP2A-A		92.9075 *						133.257			8.21335 *
12-070-TP2A-B	8.02791 *	306.129						163.79	109.689 *		9.68565 *
12-070-TP-1-COMP	27.6566	401.161		30.3872 *	12.3042 *			85.2536	119.818 *		5.09938 *
12-070-TP-2-COMP	6.70639 *	253.626						117.469			7.48402 *

* - Estimated Quantity
$ - Unvalidated Data

ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS) SCORESHEET

SILVER LAKE MILLSITE
PA NO. 12-070

AIMSS SCORESHEET

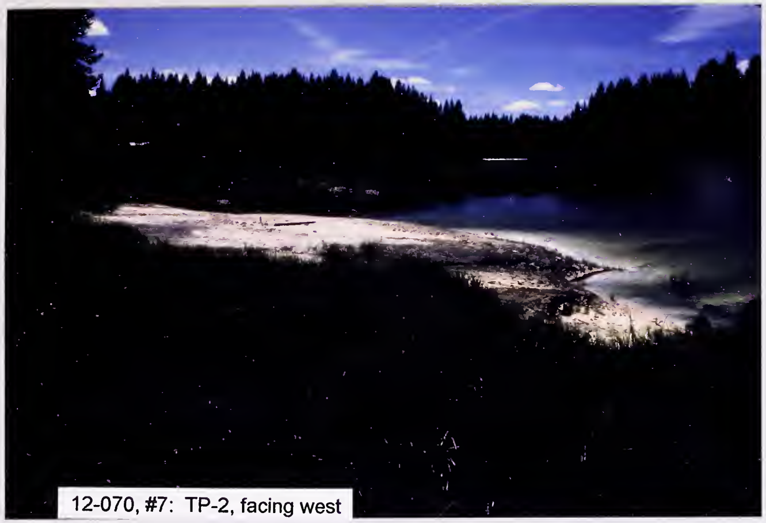
SITE NAME: SILVER LAKE MILLSITE
PA NUMBER: 12-070

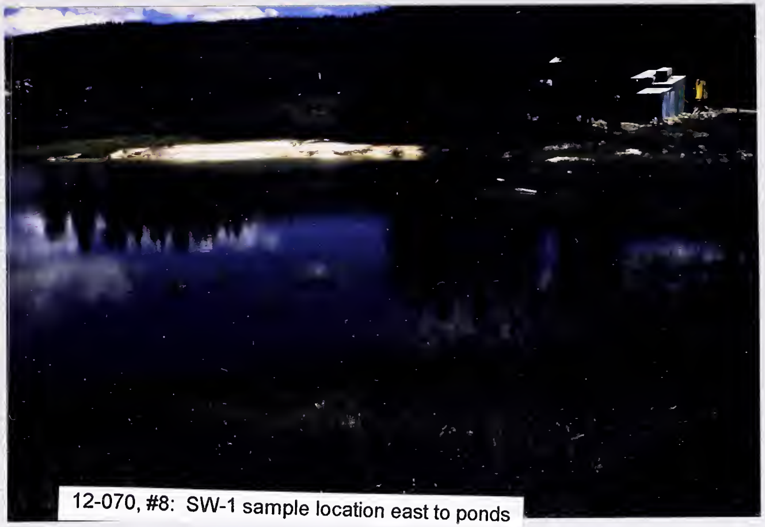
LINE NO.				
		GROUNDWATER PATHWAY		
1		OBSERVED RELEASE		0
2		EXCEEDENCES		0
3A	GW - LIKELIHOOD OF RELEASE	CONTAINMENT		20
3B		GW DEPTH		20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B	400
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C	400
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.124
6		WELLS - 1 MI. x 2.5		107.5
7	GW - TARGETS	WELLS - 1 TO 4 MI		260
8		NEAREST WELL		10
9		TARGETS SCORE	LINES 6 + 7 + 8	377.5
10		**GROUNDWATER SCORE**	LINES 4 x 5 x 9	18724
		SURFACE WATER PATHWAY		
11		OBSERVED RELEASE		0
12	SW - LIKELIHOOD OF RELEASE	EXCEEDENCES		0
13A		CONTAINMENT		20
13B		DISTANCE TO SW		20
13C		POTENTIAL TO RELEASE	LINES 13A x 13B	400
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C	400
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.137
16		DRINKING WATER POP'N		977
17		IMPACTED DRAINAGE		0
18		WETLANDS		10
19	SW - TARGETS	FISHERY		10
20		RECREATION		5
21		IRRIGATION/STOCK		2
22		T & E SPECIES HABITAT		5
23		TARGETS SCORE	SUM LINES 16 - 22	1009
24		**SURFACE WATER SCORE**	LINES 14 x 15 x 23	55293
		AIR PATHWAY		
25		OBSERVED RELEASE		0
26A	AIR - LIKELIHOOD OF RELEASE	CONTAINMENT		10
26B		DISTANCE TO POPULATION		20
26C		POTENTIAL TO RELEASE	LINES 26A x 26B	200
27		LIKELIHOOD SCORE	LINES 25 + 26C	200
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.005
29		POPULATION - 4 MILES		100
30		NEAREST RESIDENCE		10
31	AIR - TARGETS	WETLANDS		10
32		PARKS / WILDERNESS		0
33		T & E SPECIES HABITAT		5
34		TARGETS SCORE	SUM LINES 29 - 33	125
35		**AIR PATHWAY SCORE**	LINES 27 x 28 x 34	125
		DIRECT CONTACT PATHWAY		
36		OBSERVED EXPOSURE		0
37A	LIKELIHOOD OF EXPOSURE	ACCESSIBILITY		10
37B		DISTANCE TO POPULATION		20
37C		POTENTIAL EXPOSURE	LINES 37A x 37B	200
38		LIKELIHOOD SCORE	LINES 36 + 37C	200
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.000
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE		10
41		NEAREST RESIDENCE		10
42		RECREATIONAL USE		0
43		TARGETS SCORE	SUM LINES 40 - 42	20
44		**DIRECT CONTACT SCORE**	LINES 38 x 39 x 43	0
45	**TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE**	(LINES 10 + 24 + 35 + 44) / 100,000		**0.74**

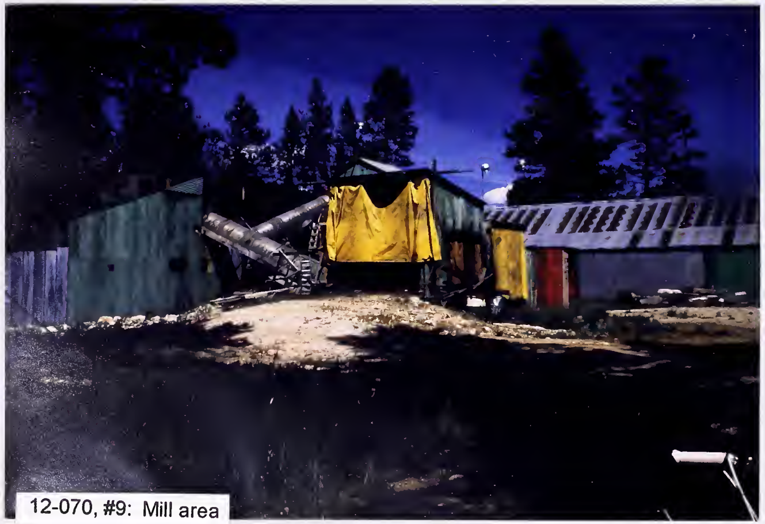
SITE NAME: SILVER LAKE MILLSITE
PA NUMBER: 12-070

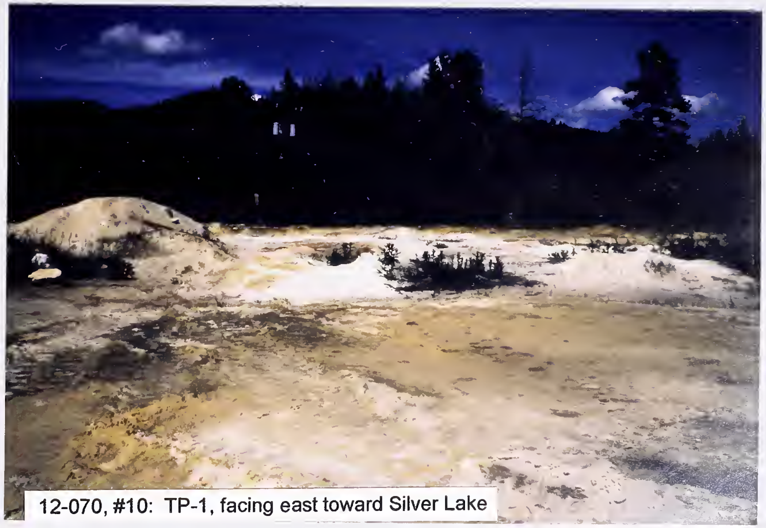
SITE SAFETY

LINE NO.				
1	THREAT	ACCESSIBILITY		10
2		OPEN SHAFTS	100 EA.	0
3		OPEN ADITS	50 EA.	0
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	0
5		HAZ. STRUCTURES	40 EA.	160
6		EXPLOSIVES		50
7		HAZ. MATERIALS		100
8		HAZARDS SCORE	SUM LINES 2 - 7	310
9		POPULATION - 1 MILE		10
10	TARGETS	NEAREST RESIDENCE		10
11		RECREATIONAL USE		0
12		TARGETS SCORE	SUM LINES 9 - 11	20
13		**SITE SAFETY SCORE**	(LINES 1 x 8 x 12) / 1,000	**62.00**


12-070, #7: TP-2, facing west


12-070, #8: SW-1 sample location east to ponds


12-070, #9: Mill area


12-070, #10: TP-1, facing east toward Silver Lake

FERGUS

WARM SPRINGS

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY
SITE INVESTIGATION LOG SHEET

Mine/Site Name: TAIL HOLT **PA#:** 14-010

Date: September 11, 1993 **Time:** 0800-1100

Field Team Leader: Bullock, Pioneer

Sampling Personnel: S. Babits, Pioneer

Visitors: None

Weather/Seasonality Observations: Clear; calm; approx. 55°F; cool, wet spring and summer.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #6: Adit discharge, GW-1; #7: WR-1; #8: WR-2. Video Tape No. 6

General Comments/Observations (not covered specifically in attached Inventory Forms): Literature found following this site investigation indicated mill was present. Additional investigation at the Collar Creek drainage may be justified.

Other Hazardous Materials/Substances Present: N/A

General Comments on Potential Remedial Alternatives: Grade, amend, and revegetate dumps.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): TAIL HOLT PA#: 14-010

Legal Description: T 17N ;R 20E ;Sec. 30 ,SE 1/4 NE1/4 ___1/4

County: FERGUS Mining District: WARM SPRINGS

Latitude: N 47° 12' 27" Longitude: W 109° 12' 35"

Primary Drainage Basin and Code: Fords Creek/10040204
Secondary Drainage Basin: Collar Gulch

USGS Quadrangle map name(s): Judith Peak

Mine Type/Commodities: Hardrock/Gold, Silver

Activity Status: Active___,Inactive/Exploration X ,Abandoned___.

Ownership status: Known YX N__; private/public? Public
Owner, Agent, or Contact(Include address and phone when available): Mike Brown, Rt. 2 Box 2034, Lewistown, MT 59457. (406) 538-9223.

Relationship to other mines/sites in the area/district: Unknown

Regulatory Status (Activity by other agencies)? Hardrock permits? Past Reclamation Activities? Possible small miner exclusion.

General site features: Elevation 5600', Slope 10°, Aspect Northern

Land use: Mining X , Recreational X , Residential___, Urban___, Agricultural X , Other(Specify)

Area of disturbed/unvegetated lands? 1.5 acres.
Dimensions:

Predominant vegetation types: Lodgepole pine, kinnikinick, blue bunch wheat grass, juniper, raspberry, aspen

Access: roads - good___,poor X ,4wd___,trail___.
Other logistical considerations (proximity to other sites).

Well logs within 1 mile radius; water rights 15 mi downstream (Attach MBMG Well Log Printout(s): There are no well logs within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). Mine is located on hillside approximately 1/3 mile above Collar Creek. Collar Creek flows south away from the site. The site is underlain by seyenite porphyry.

Mining/milling history, ore type/tenor, host rock, gangue: Claim was located in 1911 and operated from 1927 to 1934; adits were caved by 1948. Production data prior to 1926 is not available. From 1927 to 1934 inclusive, reported production from 2,961 tons of ore was 1,166 oz. Au and 647 oz. Ag. Free gold and tellurides usually associated with purple fluorite in a quartz-calcite gangue occurred in veins and seams along fractures in seyenite porphyry.

Mine Operation?

Shafts - Yes X , No ___, # 1 , Comment Air raise 100 yd south of adit

Adits - Yes X , No ___, # 2 , Comment 1 Open, but gated; 1 caved

Pits - Yes ___, No X , # ___, Comment ___

Placers - Yes ___, No X , # ___, Comment ___

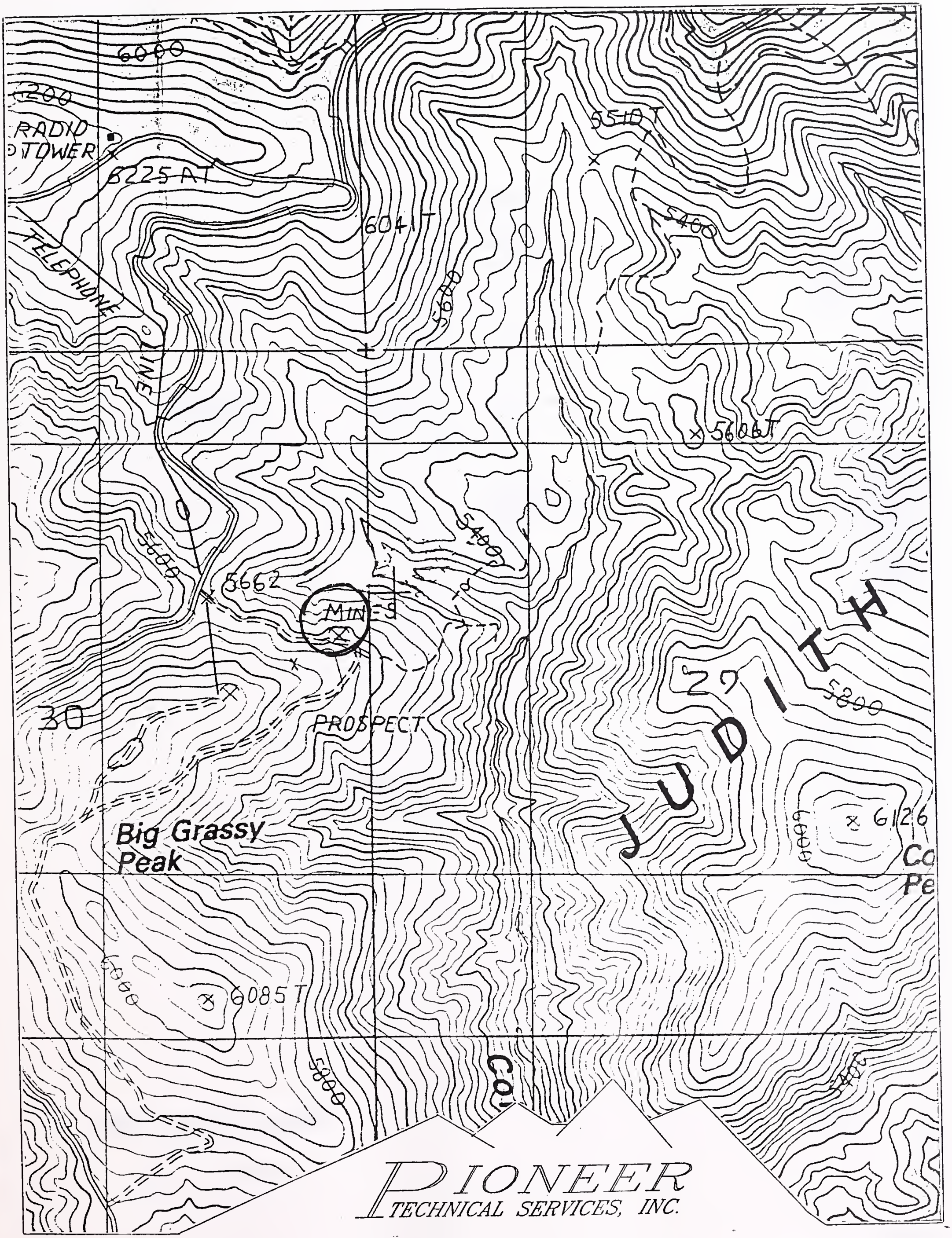
Other - Yes ___, No X , # ___, Comment ___

Mill Operation? Yes X , No ___. If yes answer the next three questions:

Period(s) of Operation: Possible operation was from 1912 to 1934.

Origin of Ore Milled - Custom Mill___ Dedicated Mill___; Number and names of mines that supplied mill feed: No information available

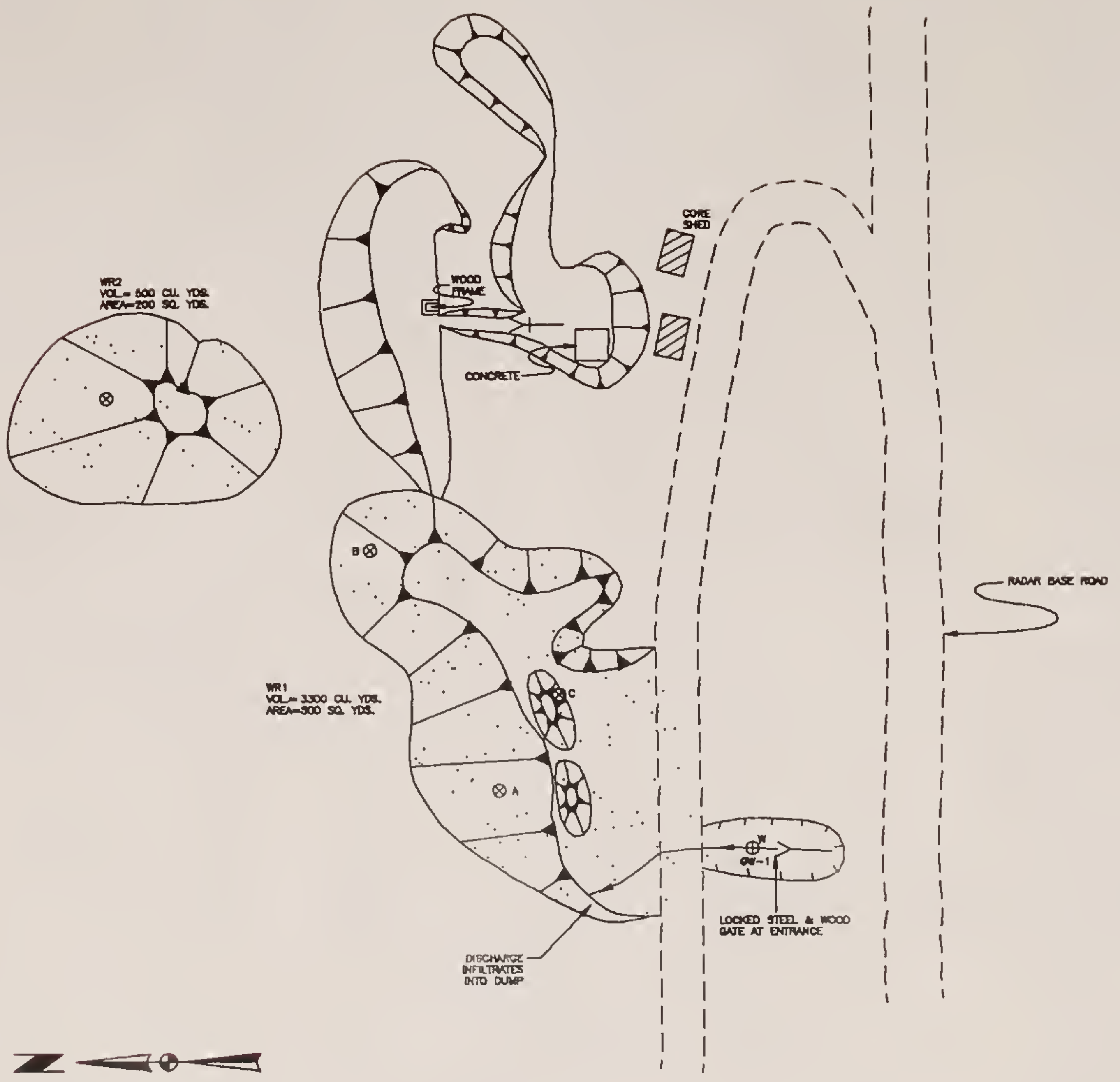
Process? Hg-amalgam, CN⁻ leach (vat, heap), floatation, smelting? A mill and cyanide plant were reported in literature obtained after this site investigation. Little evidence of milling was present at this site; however, WR-2 did appear to be washed or sorted.



TAIL HOLT, P.A. NO. 14-010

T17N, R20E, SECTION 30

SCALE: 1" = 1000'

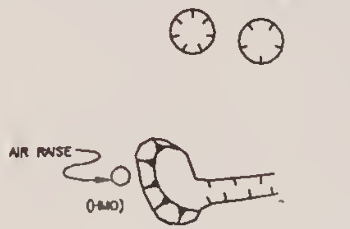


NOT TO SCALE

LEGEND

EXISTING	DESCRIPTION	EXISTING	DESCRIPTION
━━	CULVERT	—<	OPEN ADIT
✳	LIGHT (LIGHT POLE)	—+<	COLLAPSED ADIT
⌀	UTILITY POLE	☒	OPEN SHAFT
●	DECIDUOUS TREE	■	COLLAPSED SHAFT
✱	CONIFEROUS TREE	◯	EXCAVATION
—·—·—	WOOD FENCE	◯	WASTE ROCK DUMP
—▪—▪—	WIRE FENCE	✕✕✕	COLLAPSED TIMBERS
▨	BUILDING	—·—·—	RAILS
○	BARRIER POST	◕	SOIL SAMPLE
⋏	GATE	⊕	XRF SAMPLE
—·—·—	EDGE OF ASPHALT	⊕W	WATER SAMPLE GROUND AND SURFACE
— — —	EDGE OF GRAVEL	—•—•—	DRAINAGE
▼	SLOPE DIRECTION	●	WATER WELL
◯	TAILINGS POND	≡	PONDED WATER
		↓	VEGETATED WET LANDS

EXPLORATION PITS



DRAWN JTP DATE 23 NOV 93
DESIGNED TPR JOB NO. 93-17
APPROVED WJB F.B. NO.

PIONEER TECHNICAL SERVICES, INC. BUTTE, MT.

THOMAS, DEAN & HOSKINS INC.
ENGINEERING CONSULTANTS
GREAT FALLS–BOZEMAN–KALISPELL MONTANA
SPOKANE WASHINGTON

TD&H

MONTANA DEPT. OF STATE LANDS
HAZARDOUS MATERIAL INVENTORY

TAIL HOLT PA# 14-010
WARM SPRINGS DISTRICT FERGUS COUNTY

SHEET NO.

14-010.DWG SHEETS

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures / vessels sound, are runon/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): N/A

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): N/A

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): N/A

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): N/A

Comments on potential for mitigation: N/A

SOURCE INVENTORY FORM

SAMPLERS: Bullock, S. Babits

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd^3)	LOCATION/DESCRIPTION	CONTAIN-MENT	pH SU (D/S)*	RADIO-ACTIVITY (mR/HR)	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
WR-1A	WR	3,300	West side of dump; dark orange silty sand	None	6.7 (D)	0.07	14-010-WR-1	09/11/93 1545	T-Metals, ABA
WR-1B	WR		Northeast end of dump; dark orange silty sand	None	7.0 (D)	0.05			
WR-1C	WR		New waste rock piled on dump; gray sand with gravel	None	7.0 (D)	0.06			
WR-2	WR	500	Smaller pile of crushed rock below WR-1; orange sand	None	6.9 (D)	0.07			
SS-1	BKGRND	N/A	Background soil on hill above mine	N/A	N/A	N/A	14-010-SS-1	09/11/93 1000	T-Metals

*D-Direct reading(Kelway Meter); S-Saturated Paste(Orion Meter)

Comments or deviations from SOPs: 14-010-WR-1 is composite of WR-1A through -1C and WR-2.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes X , No ___, Number: ____ Identification: Adit #1

Filled shafts: Yes ___, No X , Number: ____ Identification: ____

Seeps/Springs: Yes ___, No X , Number: ____ Identification: ____

Groundwater wells within 4 miles?: Yes X , No ___;
Number of well logs: 40

Distance to nearest well used for drinking? Approximately 1.2 miles

Sample types: Flowing adits (AD); filled shafts (SH);
Residential wells (RW); Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter), temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?
Definite ____, Probable ____, Possible X , Unlikely ____.
Adit discharge has slightly elevated levels of metals, such as Cu, Cd, and Pb.

Other observations/notes: N/A

GROUNDWATER INVENTORY FORM

SAMPLERS: S. Babits

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SOURCE	FLOW* cfs/gpm	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Depth ft	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
GW-1	AD	Adit discharge at Portal	1.5 gpm (E)	8.1	NM	220	NM	75	N/A	14-010-GW-1	09/11/93 0915	T-Metals, TDS, Hardness, Cl, SO4, NO2/NO3

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): NM = Not Measured

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes X, No ___, Name(s): Collar Creek is approx. 1/4 mile below the site.

Dry streambeds: Yes ____, No X, Name(s): ____

Other surface water: Yes ____, No X, Name(s)/Description: ____

Waste materials within any floodplain: Yes ____, No X Source ID(s): ____

Approximate Flood frequency? ___ 1 yr, ___ 10 yr, ___ 100 yr

Estimated seasonal flow of stream(s) (cfs)? N/A
High Flow: ____, Average Flow: ____

Distance between waste source(s) and nearest surface water body (ft)? 1/4 mile between waste dumps and Collar Creek.

Surface water draining onto or through waste sources: Yes X, No ____, Describe: Adit discharge soaks into WR-1 but doesn't resurface at the toe of the dump.

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?) Recreation, fishery, irrigation, stock watering, wetlands

Observed erosional/sedimentation/stream turbidity problems? Yes ____, No X, Distance downstream (ft)? ____ Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present): There was no direct surface water runoff pathway from the mine to the stream in the drainage below identified during this investigation.

SURFACE WATER INVENTORY FORM

SAMPLERS: ______________________________

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SAMPLE LOCATION	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Flow* cfs/gpm	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
No samples were taken.											

FLOW: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): ______________________________

____

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides?	(SO$_3$)
Presence of evaporative salt deposits?	(ESD)
Discolored or turbid seepage?	(SPG)
Presence of long filamentous algae in drainages, mosses in moist areas?	
Presence of ferric hydroxide precipitates?	(FEOX)
Presence of burned or stressed vegetation?	(VEG)
pH ≤ 5.0	(pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? 0.25 acres of level groun available.

Wetlands present: Yes___, No_X_, Describe:

Carbonate rocks/soils: Yes_X_, No_____, Describe: None observed, although relatively high pH of waste rock and discharge water stongly indicate presence.

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10___; 10-30___; 30-100_X_; 100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or greater___; Comments

Nearest residence(ft or miles)? Approx. 1.2 miles

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Bullock, S. Babits

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH /MODERATE/LOW/NONE)
WR-1	None	Dry	4,500	4,275	Yes	Low
WR-2	None	Dry	1,800	1,760	No	None
GW-1	FEOX-Minor; filamentous algae	N/A	N/A	N/A	N/A	N/A

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No_X_, Describe:____________________

Population within 1 mile: 1-10___; 10-30___; 30-100___; 100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or greater___;
Comments_None____________________

Evidence of recreational use on site: Yes_X_, No___, Describe:_Litter_

Accessibility - Fences, warning signs, closed roads?_Unrestricted_

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes___, No_X_, Comment____________
Wilderness Area - Yes___, No_X_, Comment____________
T&E Species Habitat - Yes___, No_X_, Comment____________
Bat Habitat - Yes_X_, No___, Comment_Possible_

Primary Drainage___; Secondary Drainage_X_; No Information___:

Riparian Habitat Quality - High___, Medium_X_, Low___
Wetlands Frontage - High___, Medium_X_, Low___
Fisheries Habitat and Species Classification - _1_
Sport Fishery Classification - _4_

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes_X_, No___, Number_2_, types and locations:___
Adit and air raise

Hazardous structures: Yes_X_, No___, Number____, types and locations:_
Core shed

Unstable highwalls, pits, trenches, slopes: Yes___, No_X_, Number____, types and locations:____________________

Unstable waste piles, impoundments, undercut banks: Yes____, No_X_, Number____, types and locations:____________________

Fire and/or Explosion hazards: Yes___, No_X_, Explain:____________________

Bibliography

MBMG, Well Log Database, September 8, 1993.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0, Prepared by Montana Natural Resource Information System, December 1989.

MDSL/AMRB Files, Abandoned Mine Lands Portal Inventory Form for the Tail Holt site, Prepared by Culwell Larsen, July 7 and September 27, 1983.

MDSL/AMRB Files, Abandoned Mine Reclamation Inventory Field Form for the Tail Holt site, Prepared by Chen-Northern, July 27, 1989.

USBM, Mines and Mineral Deposits (Except Fuels), Fergus County, Montana, Information Circular 7544, Written by Almon F. Robertson, January 1950.

USGS, Topographic Map, Judith Peak, Montana, 7 1/2 minute Quadrangle, 1985.

LABORATORY ANALYTICAL DATA

TAIL HOLT
PA NO. 14-010

Tail Holt PA# 14-010
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER – BULLOCK
INVESTIGATION DATE: 09/11/93

SOLID MATRIX ANALYSES

Metals in soils
Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
14-010-WR-1	283	112	0.8 U	9.2	1.43	61	31900	0.748 J	1080	4.17	69.4	5.77 UJ	152	NR
BACKGROUND	31.8	226	0.8 U	6.41	8.08	14.1	20700	0.039 J	3060	12	45.5	5.67 UJ	107	NR

U – Not Detected; J – Estimated Quantity; X – Outlier for Accuracy or Precision; NR – Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	TOTAL SULFUR ACID BASE t/1000t	NEUTRAL. POTENT. t/1000t	SULFUR ACID BASE POTENT. t/1000t	SULFATE SULFUR %	PYRITIC SULFUR %	ORGANIC SULFUR %	PYRITIC SULFUR ACID BASE t/1000t	SULFUR ACID BASE POTENT. t/1000t
14-010-WR-1	0.47	14.7	12.5	–2.2	0.09	0.24	0.14	7.5	4.98

WATER MATRIX ANALYSES

Metals in Water
Results in ug/L

FIELD ID	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
14-010-GW-1	4.32 JX	31.2	2.57 U	9.7 U	6.83 U	36.4	857	0.14	82.6	12.7 U	6.6	30.7 UJX	38.6	106

U – Not Detected; J – Estimated Quantity; X – Outlier for Accuracy or Precision; NR – Not Requested

Wet Chemistry
Results in mg/l

FIELD I.D.	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
14-010-GW-1	179	< 5.0	32	0.21	NR

LEGEND

WR1 – Composite of subsamples WR1A, 1B, 1C, and 2.
BACKGROUND – From Tail Holt (14-010-SS-1).
GW1 – Adit discharge at portal.

XRF ANALYSIS RESULTS

TAIL HOLT
PA NO. 14-010

Mine Name: Tail Holt PA# 14-010
XRF Field Analyses
Results in PPM

XRF SAMPLE ID	CrHI	K	Ca	Ti	CrLO	Mn	Fe	Co	Cu	Zn	As	Sr
14-010-WR1-A		30031.2	6526.86	677.878 *		2205.46	34889.7		52.9298 *	90.5907 *	149.708	563.57
14-010-WR1-B		26699.4	2367.79			2500.87	53746.6			103.148 *	423.427	595.667
14-010-WR1-C		32178 $	7593 $	397 $		1432 $	19990 $	140 $	32 $	69 $	243 $	550 $
14-010-WR-1-COMP		30808.4	7612.41			1956.41	35623.6			173.319	284.089	605.139
14-010-WR-2		35259.5	17632.5			1236.85	26578.5			303.09	269.309	614.895

	Zr	Hg	Mo	Pb	Rb	Cd	Sb	Ba	Ag	U	Th
14-010-WR1-A	186.947			25.2132 *	248.054			1531.45	97.4827 *		13.0681 *
14-010-WR1-B	145.267			56.1004 *	258.423			1224.37	122.671 *		12.0021 *
14-010-WR1-C				35 $	247 $			1165 $	70 $		14 $
14-010-WR-1-COMP	152.811			36.1256 *	273.889			1420.4	90.0914 *		13.5908 *
14-010-WR-2	169.176				272.348			1216.85			14.7622 *

* – Estimated Quantity
$ – Unvalidated Data

ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS) SCORESHEET

TAIL HOLT
PA NO. 14-010

MDSL AMRB/PIONEER 4/9/93

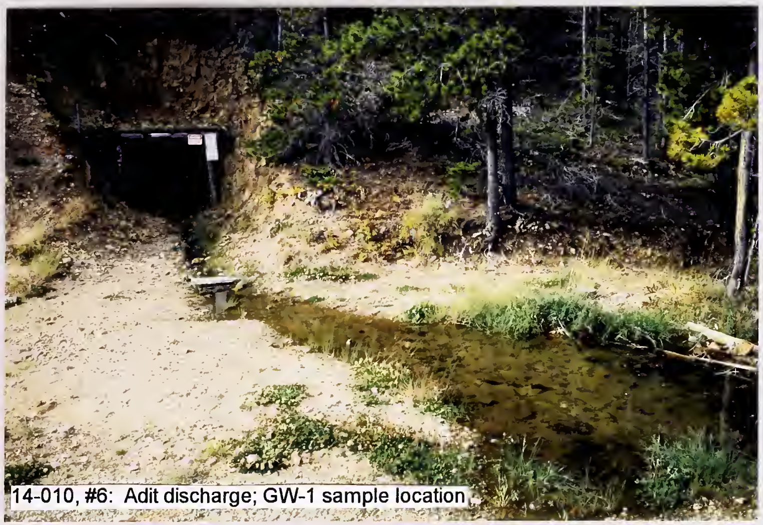
AIMSS SCORESHEET

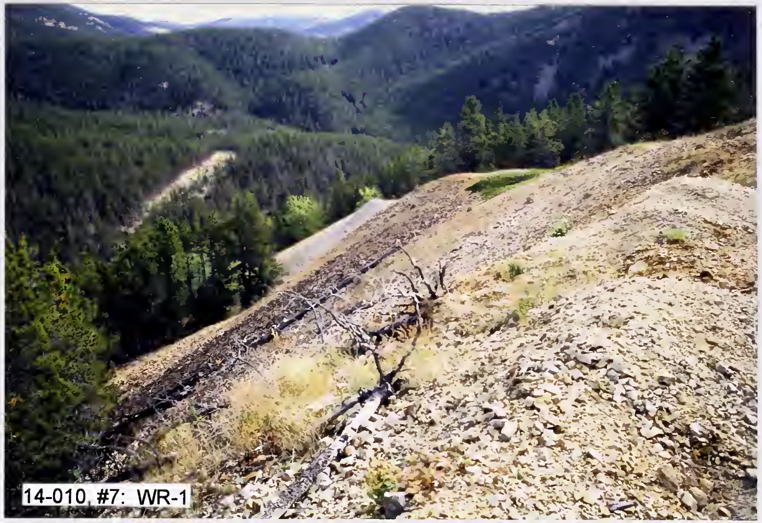
SITE NAME: TAIL HOLT
PA NUMBER: 14-010

LINE NO.				
		GROUNDWATER PATHWAY		
1		OBSERVED RELEASE		0
2		EXCEEDENCES		0
3A	GW - LIKELIHOOD OF RELEASE	CONTAINMENT		20
3B		GW DEPTH		20
3C		POTENTIAL TO RELEASE	LINES 3A x 3B	400
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C	400
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.928
6	GW - TARGETS	WELLS - 1 MI. x 2.5		0.0
7		WELLS - 1 TO 4 MI		40
8		NEAREST WELL		0
9		TARGETS SCORE	LINES 6 + 7 + 8	40.0
10		**GROUNDWATER SCORE**	LINES 4 x 5 x 9	14848
		SURFACE WATER PATHWAY		
11		OBSERVED RELEASE		0
12	SW - LIKELIHOOD OF RELEASE	EXCEEDENCES		0
13A		CONTAINMENT		20
13B		DISTANCE TO SW		2
13C		POTENTIAL TO RELEASE	LINES 13A x 13B	40
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C	40
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.973
16	SW - TARGETS	DRINKING WATER POP'N		0
17		IMPACTED DRAINAGE		0
18		WETLANDS		10
19		FISHERY		20
20		RECREATION		5
21		IRRIGATION/STOCK		2
22		T & E SPECIES HABITAT		0
23		TARGETS SCORE	SUM LINES 16 - 22	37
24		**SURFACE WATER SCORE**	LINES 14 x 15 x 23	1440
		AIR PATHWAY		
25		OBSERVED RELEASE		0
26A	AIR - LIKELIHOOD OF RELEASE	CONTAINMENT		10
26B		DISTANCE TO POPULATION		5
26C		POTENTIAL TO RELEASE	LINES 26A x 26B	50
27		LIKELIHOOD SCORE	LINES 25 + 26C	50
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.003
29	AIR - TARGETS	POPULATION - 4 MILES		20
30		NEAREST RESIDENCE		0
31		WETLANDS		10
32		PARKS / WILDERNESS		0
33		T & E SPECIES HABITAT		0
34		TARGETS SCORE	SUM LINES 29 - 33	30
35		**AIR PATHWAY SCORE**	LINES 27 x 28 x 34	5
		DIRECT CONTACT PATHWAY		
36		OBSERVED EXPOSURE		50
37A	LIKELIHOOD OF EXPOSURE	ACCESSIBILITY		20
37B		DISTANCE TO POPULATION		5
37C		POTENTIAL EXPOSURE	LINES 37A x 37B	100
38		LIKELIHOOD SCORE	LINES 36 + 37C	150
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.003
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE		0
41		NEAREST RESIDENCE		0
42		RECREATIONAL USE		2
43		TARGETS SCORE	SUM LINES 40 - 42	2
44		**DIRECT CONTACT SCORE**	LINES 38 x 39 x 43	1
45	**TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE** (LINES 10 + 24 + 35 + 44) / 100,000			**0.16**

SITE NAME: TAIL HOLT
PA NUMBER: 14-010

LINE NO.		**SITE SAFETY**		
1	THREAT	ACCESSIBILITY		20
2		OPEN SHAFTS	100 EA.	100
3		OPEN ADITS	50 EA.	50
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	0
5		HAZ. STRUCTURES	40 EA.	40
6		EXPLOSIVES		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 - 7	190
9		POPULATION - 1 MILE		0
10	TARGETS	NEAREST RESIDENCE		0
11		RECREATIONAL USE		2
12		TARGETS SCORE	SUM LINES 9 - 11	2
13		**SITE SAFETY SCORE**	(LINES 1 x 8 x 12) / 1,000	**7.60**


14-010, #6: Adit discharge; GW-1 sample location


14-010, #7: WR-1

14-010, #8: WR-2

MONTANA DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

HAZARDOUS MATERIALS INVENTORY SITE INVESTIGATION LOG SHEET

Mine/Site Name: CUMBERLAND **PA#:** 14-017

Date: September 11, 1993 **Time:** 1030-1630

Field Team Leader: Bullock, Pioneer

Sampling Personnel: S. Babits, Pioneer

Visitors: None

Weather/Seasonality Observations: Clear; calm; warm (approx. 65°F); cool, wet spring and summer.

Photographic Log (Film Roll and Photo No.'s/Video Tape Number): #9: SW-1; #10: WR-1; #11: WR-2; #12: Glory Hole; #13: SW-2; #14: WR-3; #15: Mill; #16: Tailings. Video Tape No. 6

General Comments/Observations (not covered specifically in attached Inventory Forms): N/A

Other Hazardous Materials/Substances Present:

General Comments on Potential Remedial Alternatives: Remove contaminated material from drainage and reclaim unvegetated dumps and tailings.

I. BACKGROUND INFORMATION

This information is to be collected to the extent practical prior to conducting the Site Investigation. Data gaps shall be filled in during the investigation.

Mine/Site Name(s): CUMBERLAND PA#: 14-017

Legal Description: T 16N ;R 20E ;Sec. 5 , NE1/4 NE1/4 ___1/4

County: FERGUS Mining District: WARM SPRINGS

Latitude: N 47° 10' 58" Longitude: W 109° 12' 30"

Primary Drainage Basin and Code: Maiden Creek/10040204
Secondary Drainage Basin: Spotted Horse Creek

USGS Quadrangle map name(s): Judith Peak

Mine Type/Commodities: Hardrock/Silver, Gold

Activity Status: Active___,Inactive/Exploration___,Abandoned X .

Ownership status: Known YX N__; private/public? Private
Owner, Agent, or Contact(Include address and phone when available): Janet Dargitz, 116 Grandview Road, State College, PA 16801. (814) 237-3584; Anne Fowle Anderson, P.O. Box 1148, Vienna, VA 22183. (703) 671-6018.

Relationship to other mines/sites in the area/district: Located partially within permit boundary of Spotted Horse Project.

Regulatory Status (Activity by other agencies)? Hardrock permits? Past Reclamation Activities? N/A

General site features: Elevation 5160' , Slope 5°-20° , Aspect East to Southeast

Land use: Mining X , Recreational X , Residential___, Urban___, Agricultural___, Other(Specify)

Area of disturbed/unvegetated lands? Approx. 2.5 acres.
Dimensions: Site dimensions are approximately 900 feet x 1,500 feet.

Predominant vegetation types: Douglas fir, Lodgepole and Ponderosa pines, juniper, grouse whortleberry, pine grass

Access: roads - good___,poor X ,4wd___,trail___.
Other logistical considerations (proximity to other sites). Approx. 4 miles from the Tail Holt mine.

Well logs within 1 mile radius; water rights 15 mi downstream (Attach MBMG Well Log Printout(s): There are 5 well logs within a 1 mile radius.

General site geologic, hydrologic, and hydrogeologic settings (Also note presence of radioactive minerals). The site is underlain by limestone (Madison) and the Gold Hill syenite porphyry. Site is located on the Spotted Horse Creek.

Mining/milling history, ore type/tenor, host rock, gangue: Mine was discovered in 1880, but remained largely undeveloped until 1904. A mill was constructed in 1909 or 1910. Ore occurred in a vein along the contact of Madison Limestone and the eastern edge of the Gold Hill syenite porphyry. Gold occurred free and as sylvanite and telluride usually associated with fluorite. The gaugue in the vein consisted of brecciated limestone, altered porphyry, calcite, and chalcedonic silica. Production from 1903 to 1923 inclusive was 15,236 oz. of Au, 12,771 oz. Ag from 40,238 tons of ore for an average grade of 0.376 oz. Au and 0.312 oz. Ag/ton.

Mine Operation?
Shafts - Yes___, No_X_, #_____, Comment
Adits - Yes_X_, No___, #_6_, Comment 2 open; 4 caved
Pits - Yes_X_, No___, #_1_, Comment With large highwall
Placers - Yes___, No_X_, #_____, Comment
Other - Yes___, No_X_, #_____, Comment

Mill Operation? Yes_X_, No____. If yes answer the next three questions:

Period(s) of Operation: 1909 to 1918

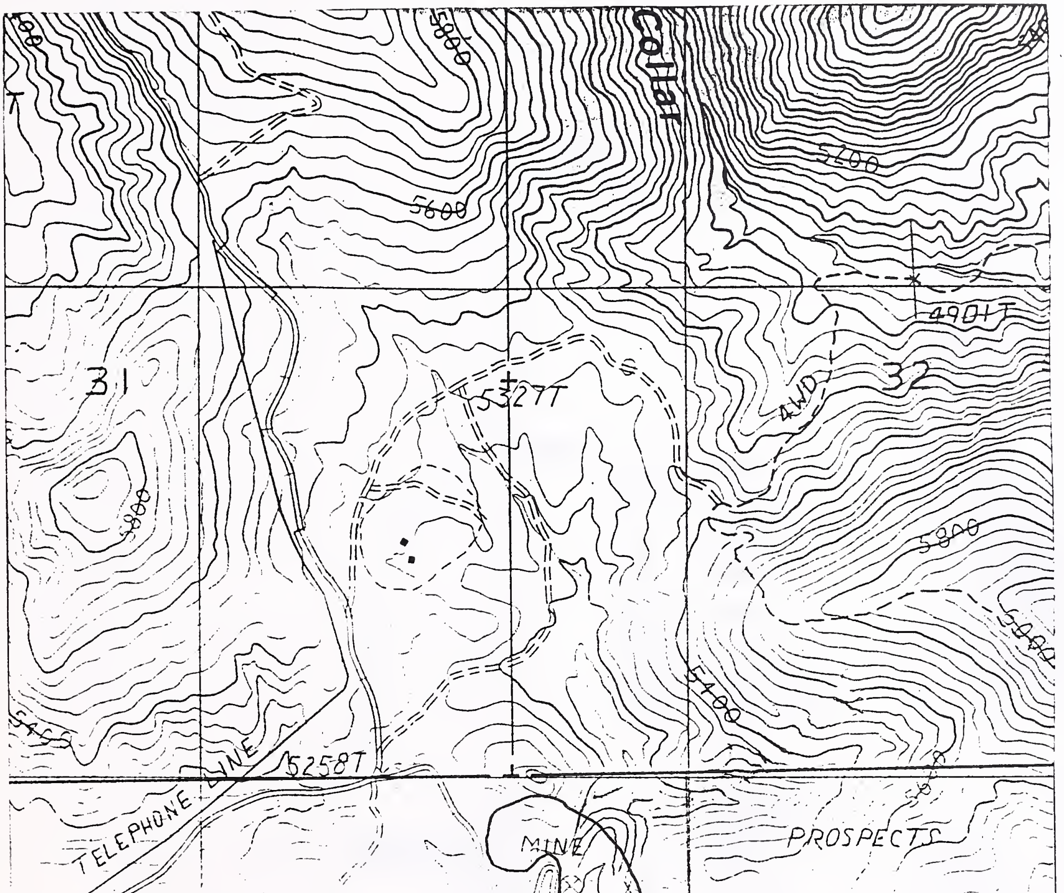
Origin of Ore Milled - Custom Mill___ Dedicated Mill_X_; Number and names of mines that supplied mill feed: Unknown

Process? Hg-amalgam, CN^- leach (vat, heap), floatation, smelting? In 1910, the site had a CN- vat leach with a crusher, rolls and wifley tables, and a 100-ton CN- circuit. The mill was upgraded later in the first year to increase capacity to 250-ton per day. Mill burned in 1948. The ore was processed through Spotted Horse Mill from 1916 to 1918.

Montana Bureau of Mines and Geology
Water Well Log Data

11/15/1993

Well No.	Location	Depth	Yield	Static Water Level
M:28424	16N 20E 06	26.0	35.0	10.00
M:28426	16N 20E 06 AD	35.0	10.0	10.00
M:28425	16N 20E 06 AD	54.0	5.0	16.00
M:2041	16N 20E 06 ADCC	255.0	5.7	85.96
M:28428	16N 20E 08 CD	46.0	30.0	3.00

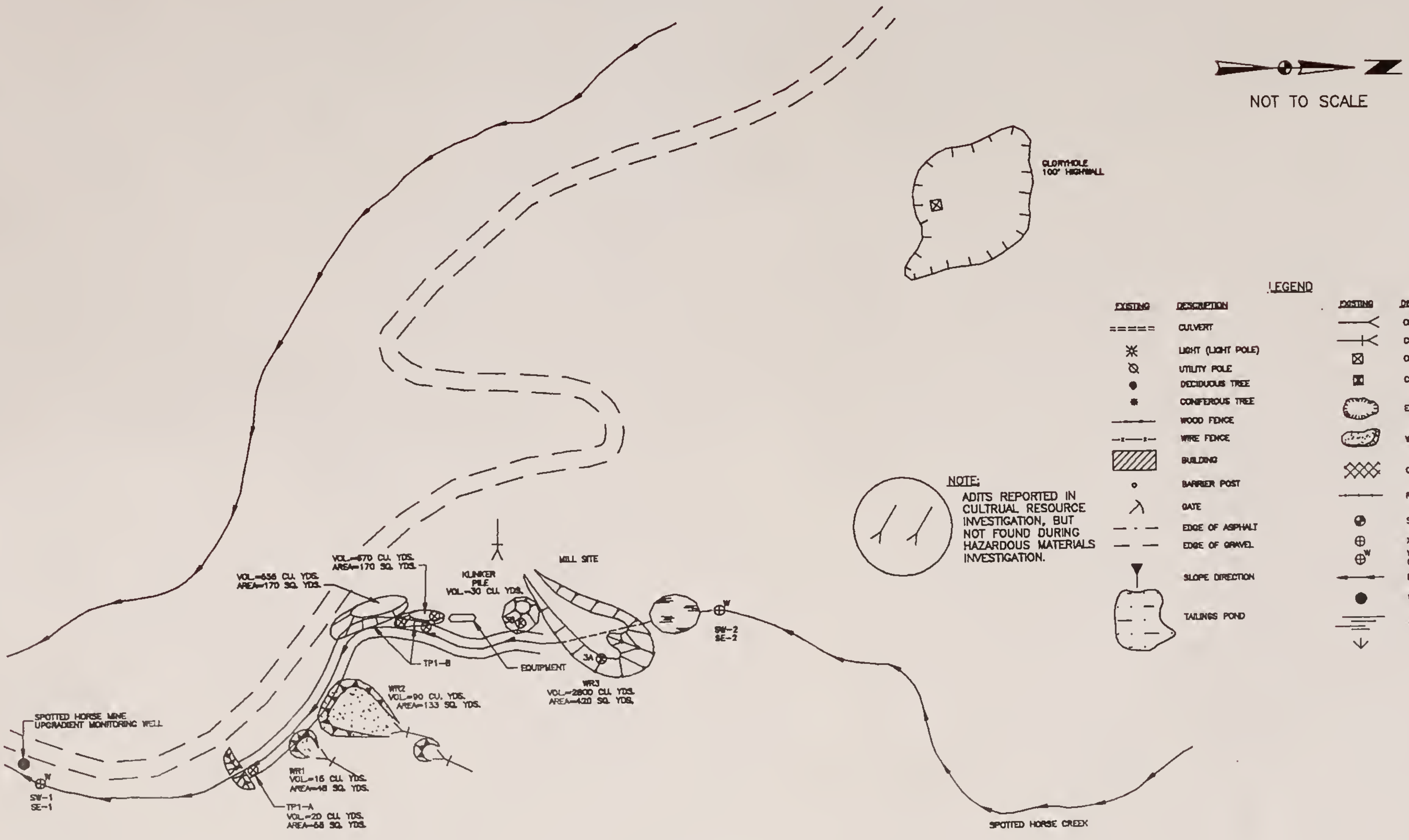


PIONEER TECHNICAL SERVICES, INC.

CUMBERLAND, P.A. NO. 14–017

T16N, R20E, SECTION 05

SCALE: 1" = 1000'



NOTE:
ADITS REPORTED IN CULTURAL RESOURCE INVESTIGATION, BUT NOT FOUND DURING HAZARDOUS MATERIALS INVESTIGATION.

LEGEND

EXISTING	DESCRIPTION	EXISTING	DESCRIPTION
=====	CULVERT	—<	OPEN ADIT
✳	LIGHT (LIGHT POLE)	—+<	COLLAPSED ADIT
⊘	UTILITY POLE	☒	OPEN SHAFT
●	DECIDUOUS TREE	▣	COLLAPSED SHAFT
✱	CONIFEROUS TREE	⬭	EXCAVATION
—•—•—	WOOD FENCE	⬭	WASTE ROCK DUMP
—x—x—	WIRE FENCE	⨯⨯⨯	COLLAPSED TIMBERS
▨	BUILDING	—+—+—	RAILS
○	BARRIER POST	◕	SOIL SAMPLE
⋏	GATE	⊕	XRF SAMPLE
— · —	EDGE OF ASPHALT	⊕W	WATER SAMPLE GROUND AND SURFACE
— —	EDGE OF GRAVEL	—◂—	DRAINAGE
▼	SLOPE DIRECTION	●	WATER WELL
⬭	TAILINGS POND	≡	PONDED WATER
		↓	VEGETATED WET LANDS

DRAWN JTP DATE 24 NOV 93
DESIGNED TPR JOB NO. 93-17
APPROVED WJB F.B. NO.

PIONEER TECHNICAL SERVICES, INC. BUTTE, MT.

TD&H

THOMAS, DEAN & HOSKINS INC.
ENGINEERING CONSULTANTS
GREAT FALLS–BOZEMAN–KALISPELL MONTANA
SPOKANE WASHINGTON

MONTANA DEPT. OF STATE LANDS
HAZARDOUS MATERIAL INVENTORY

CUMBERLAND PA# 14-017
WARM SPRINGS DISTRICT FERGUS COUNTY

SHEET NO.

14-017.DWG SHEETS

II. INFORMATION COLLECTED ON SITE

A. SOLID MATRIX WASTE CHARACTERIZATION

1. Waste Characteristics - Use table on following page.

Unique source identification (e.g. west waste rock dump #2) and abbreviation on sketch map and source list (e.g. WWRD2). Locate source on sketch map with any measured distances from at least two landmarks.

Source types: Waste rock dumps and piles (WR); tailings impoundments and piles (TAIL); vats, vessels, tanks that contain something (VAT); barrels - not empty (BAR); soils contaminated by spills or leaks (SP); suspected asbestos containing materials (ACM); garbage/refuse/junk dumps (DMP); other sources (OTH).

Source size: Estimated volumes (cu. yards or feet, # of barrels) for each source identified above.

Location/Description: List location and description for each source identified above.

Waste containment: Is the source contained with respect to groundwater, surface water, and airborne releases or the potential to release? Good, adequate, poor, or none. Are waste structures / vessels sound, are runon/runoff controls in place, are wastes covered or vegetated, pond liners intact?

2. TAILINGS IMPOUNDMENTS - If tailings impoundments are also present, complete the following questions.

Describe the tailings grain size distribution (approximate % sand, silt, & clay): 70% coarse sand; 30% fine silty sand

Determine tailings impoundment depth and describe stratification of the tailings if observable (based on texture and color): Most of the tailings are fluvially deposited by Spotted Horse Creek.

Are tailings wet or dry (Describe location of partially wetted tailings impoundments): Dry on surface; wet below.

Describe condition of the tailings impoundment (Note condition of dams or structures, location of breaches): At least two tailings ponds were originally constructed, but both have been breached and most of the tailings washed away.

Comments on potential for mitigation: Removal of tailings from active floodplain.

SOURCE INVENTORY FORM

SAMPLERS: Bullock, S. Babits

SOURCE I.D. NO.	SOURCE TYPE	SOURCE VOLUME (yd^3)	LOCATION/DESCRIPTION	CONTAIN-MENT	pH SU (D/S)*	RADIO-ACTIVITY (mR/HR)	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
TP-1A-A	TAIL	20	At first former dam; coarse brown sand	Breached Pond	7.0 (D)	0.03	14-017-TP-1	09/13/93 0925	T-Metals, ABA, CN-
TP-1A-B	TAIL		Below TP-1A-A; brown sitly clay	Breached Pond	5.0 (D)	0.03	14-017-TP-2	09/13/93 0925	T-Metals, ABA, CN-
TP-1B	TAIL	1,200	Tailings directly below mill; coarse brown sand	None	7.0 (D)	0.02			
WR-1	WR	15	Lowest of eastern three dumps; syenite gravel and sand	None	7.0 (D)	0.10	14-017-WR-1	09/13/93 0935	T-Metals, ABA
WR-2	WR	90	Middle of eastern three dumps; syenite porphyry sand	None	7.0 (D)	0.06			
WR-3A	WR	2,800	Tunnel dump, west end; crushed limestone	None	6.8 (D)	0.04	14-017-WR-2	09/13/93 0935	T-Metals, ABA
WR-3B	WR	30	Tunnel dump, clinker appearance	None	3.5 (D)	0.04			

* D-Direct reading(Kelway Meter); S-Saturated Paste(Orion Meter)

Comments or deviations from SOPs: 14-017-TP-1 is composite of TP-1A-A and TP-1B. 14-017-TP-2 is grab of TP-1A-B. 14-017-WR-1 is composite of WR-1 and WR-2. 14-017-WR-2 is composite of WR-3A and -3B. Background sample was taken at the Tail Holt mine.

B. GROUNDWATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map.

Flowing adits: Yes___, No_X_, Number:____ Identification:____________

Filled shafts: Yes___, No_X_, Number:____ Identification:____________

Seeps/Springs: Yes___, No_X_, Number:____ Identification:____________

Groundwater wells within 4 miles?: Yes_X_, No___;
Number of well logs:_28___

Distance to nearest well used for drinking?_Approx. 0.5 mile______

Sample types: Flowing adits (AD); filled shafts (SH);
Residential wells (RW); Monitoring wells (MW); Seeps/Springs (SP).

Field Measurements: Flow (measured or estimated), pH (meter), Eh (meter), SC (meter), temperature (meter), Alkalinity (test kit)?

Potential for groundwater contamination (explain)?
Definite____, Probable____, Possible_X_, Unlikely____.
Limited groundwater contact with tailings and waste rock.

Other observations/notes: Upgradient groundwater monitoring results from the Spotted Horse hardrock permit application (1987 or 1988) may serve as downgradient conditions for the Cumerland. Although no upgradient well or spring was present for the Cumberland; therefore, no samples were taken.

GROUNDWATER INVENTORY FORM

SAMPLERS: ____________________

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SOURCE	FLOW* cfs/gpm	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Depth ft	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
No samples were taken.												

FLOW: Estimated (E) or Measured (M) from adit, shaft, seep or spring?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): ____________________

C. SURFACE WATER CHARACTERISTICS

Use table on following page. Identify all locations on sketch map or topographic map. Indicate drainage patterns (run-on/runoff) and directions on sketch maps.

Flowing streams: Yes X , No___, Name(s): Spotted Horse Creek

Dry streambeds: Yes____, No X , Name(s):

Other surface water: Yes____, No X , Name(s)/Description:

Waste materials within any floodplain: Yes X , No___ Source ID(s): WR-1, WR-3, TP-1A, and TP-1B

Approximate Flood frequency? X 1 yr,___10 yr,___100 yr

Estimated seasonal flow of stream(s) (cfs)?
High Flow: 3.0 cfs , Average Flow: 0.3 cfs

Distance between waste source(s) and nearest surface water body (ft)? 0 feet; WR-3 dams the creek.

Surface water draining onto or through waste sources: Yes X , No____,
Describe: Stream flows under WR-3.

Surface water use within 15 miles downstream? (Drinking water supply, irrigation, residential use? Sensitive environments within 15 miles downstream? Park, Wilderness, Fishery, Wetland, T&E habitat?)
Irrigation, stock watering

Observed erosional/sedimentation/stream turbidity problems? Yes X , No_____, Distance downstream (ft)? N/A Describe/explain (Note streambank stability and condition of streambank vegetation and any manmade structures or channel changes present):
Stream is turbid both up and down stream of the site.

SURFACE WATER INVENTORY FORM

SAMPLERS: Bullock, S. Babits

SAMPLE I.D. NO.	SAMPLE TYPE	DESCRIPTION OF SAMPLE LOCATION	pH SU	SC µS/cm @ 25°C	Eh mV	Temp °C	ALK. mg/L as $CaCO_3$	Flow* cfs/gpm	LAB. SAMPLE NO.	DATE/ TIME	ANALYSES
SW-1	SW	Downstream of lower tailings near Spotted Horse Well	8.48	NM	167	NM	105	45 gpm (E)	14-017-SW-1	09/11/93 1300	T-Metals, TDS, Hardness, Cl, SO4, NO2/NO3
SE-1	SE	Downstream of lower tailings near Spotted Horse Well	N/A	N/A	N/A	N/A	N/A	N/A	14-017-SE-1	09/11/93 1300	T-Metals
SW-2	SW	Upstream of Pond created by WR-3 on Spotted Horse Creek	8.4	NM	214	NM	75	20 gpm (E)	14-017-SW-2	09/11/93 1345	T-Metals, TDS, Hardness, Cl, SO4, NO2/NO3
SE-2	SE	Upstream of Pond created by WR-3 on Spotted Horse Creek	N/A	N/A	N/A	N/A	N/A	N/A	14-017-SE-2	09/11/93 1345	T-Metals

FLOW: Estimated (E) or Measured (M)?

Comments or Deviations from the SOPs (Pioneer SAP, 1993): NM = Not measured due to meter malfunction.

D. ACID MINE DRAINAGE (AMD) POTENTIAL

Evaluate each source in table on next page.

AMD Characteristics:

Presence and abundance of sulfides? (SO_3)

Presence of evaporative salt deposits? (ESD)

Discolored or turbid seepage? (SPG)

Presence of long filamentous algae in drainages, mosses in moist areas?

Presence of ferric hydroxide precipitates? (FEOX)

Presence of burned or stressed vegetation? (VEG)

pH ≤ 5.0 (pH)

General Potential for AMD Mitigation:

Area available for treatment (acres)? Very limited; steep drainage, approx. 0.75 acres of relatively flat ground.

Wetlands present: Yes___, No X , Describe:___

Carbonate rocks/soils: Yes X , No___, Describe: Madison Limestone

E. AIR PATHWAY CHARACTERISTICS

Population within 4-mile radius: 1-10___; 10-30___; 30-100 X ; 100-300___; 300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or greater___; Comments___

Nearest residence(ft or miles)? Approx. 0.5 miles

For each source (table next page):

Available fine materials? Surface area?

Uncovered and unvegetated? Wet or dry?

Overall dust propagation potential:
observed high moderate low none

ACID DRAINAGE/AIR PATHWAY INVENTORY FORM

SAMPLERS: Bullock, S. Babits

SOURCE I.D. NO.	ACID MINE DRAINAGE CHARACTERISTICS (LIST)	MOISTURE CONTENT (WET/DRY/PARTIAL)	SURFACE AREA (SQUARE FEET)	UNCOVERED/UNVEGETATED AREA (SQUARE FEET)	AVAILABLE FINES (YES/NO)	DUST PROPAGATION POTENTIAL (OBSERVED/HIGH/MODERATE/LOW/NONE)
TP-1A	None	Partial	500	250	No	None
TP-1B	None	Partial	3,060	1,530	No	None
WR-1	None	Dry	400	80	No	None
WR-2	None	Dry	1,200	1,080	No	None
WR-3	pH	Partial	3,780	1,890	No	None

Notes and Clarifications:

F. DIRECT CONTACT CHARACTERISTICS

Residents or workers within 200 feet of sources: Yes____, No__X__,
Describe:______________________________

Population within 1 mile: 1-10___; 10-30_X_; 30-100___; 100-300___;
300-1,000___; 1,000-3,000___; 3,000-10,000___; 10,000 or greater___;
Comments______________________________

Evidence of recreational use on site: Yes_X_, No___, Describe: Litter; campfire rings

Accessibility - Fences, warning signs, closed roads? "No Trespassing" signs

Sensitive environments on-site or adjacent to site:

State or National Parks - Yes___, No_X_, Comment__________
Wilderness Area - Yes___, No_X_, Comment__________
T&E Species Habitat - Yes___, No_X_, Comment__________
Bat Habitat - Yes_X_, No___, Comment Possible

Primary Drainage_X_; Secondary Drainage___; No Information___:

Riparian Habitat Quality - High___, Medium_X_, Low___
Wetlands Frontage - High___, Medium___, Low_X_
Fisheries Habitat and Species Classification - Not Rated
Sport Fishery Classification - Not Rated

G. SAFETY CHARACTERISTICS

Verify completeness of AMRB Inventory

Hazardous openings: Yes_X_, No___, Number_2_, types and locations:___
Adits

Hazardous structures: Yes___, No_X_, Number____, types and locations:_

Unstable highwalls, pits, trenches, slopes: Yes_X_, No___, Number_1_,
types and locations: Large glory hole with 100' highwall

Unstable waste piles, impoundments, undercut banks: Yes_X_, No____,
Number_2_, types and locations: WR-3 in creek may have the potential to wash out during high flow event. Also, tailings still eroding into creek during high flows.

Fire and/or Explosion hazards: Yes___, No_X_, Explain:__________

Bibliography

Forrest, Richard, Geology and Mineral Deposits of the Warm Springs-Giltedge District, Fergus County, Montana, Thesis written for the Montana College of Mineral Science and Technology, Butte, Montana, May 1971.

MBMG, Well Log Database, September 8, 1993.

MDFWP, Montana Rivers Information System Rivers Report, Version 2.0, Prepared by Montana Natural Resource Information System, December 1989.

MDSL/AMRB Files, Abandoned Mine Lands Portal Inventory for the Cumberland, Prepared by Unknown, July 7, 1983.

MDSL/AMRB Files, Montana Cultural Resource Inventory, Cumberland Mine, Prepared by Gene Munson of GCM Services, Inc., 1987.

USBM, Mines and Mineral Deposits (Except Fuels), Fergus County, Montana, Information Circular 7544, Written by Almon F. Robertson, January 1950.

USGS, Topographic Map, Judith Peak, Montana, 7 1/2 minute Quadrangle, 1985.

LABORATORY ANALYTICAL DATA

CUMBERLAND
PA NO. 14-017

Cumberland PA# 14-017
AMRB HAZARDOUS MATERIALS INVENTORY
INVESTIGATOR: PIONEER - BULLOCK
INVESTIGATION DATE: 09/11/93

SOLID MATRIX ANALYSES

Metals in soils   Results per dry weight basis

FIELD ID	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
14-017-SE-1	78.8	253	1.0 U	2.08	4.55	7.86	13800	0.566 J	305	6.18	53.9	6.85 UJ	208	NR
14-017-SE-2	29.8	157	1.2 U	2.67	3.68	6.5	10100	0.123 J	502	3.6	30.6	8.02 UJ	73.3	NR
14-017-TP-1	129	210	0.8 U	2.65	5.22	7.52	8130	2.53 J	233	14.3	19.6	5.55 UJ	347	2.55
14-017-TP-2	601	627	1.3 U	13.4	22.6	46	33500	39.2 J	1070	67.4	163	17.7 J	2170	1.57
14-017-WR-1	86.9	281	9.5	4.48	0.96 U	61.4	16900	0.275 J	4390	8.61	1270	4.87 UJ	1090	NR
14-017-WR-2	154	49.3	5.2	9.12	15.1	384	56500	0.03 U	16600	31.2	1190	6.4 UJ	6450	NR
BACKGROUND	31.8	226	0.8 U	6.41	8.08	14.1	20700	0.039 J	3060	12	45.5	5.67 UJ	107	NR

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Acid/Base Accounting

FIELD ID	TOTAL SULFUR %	TOTAL SULFUR ACID BASE t/1000t	NEUTRAL. POTENT. t/1000t	SULFUR ACID BASE POTENT. t/1000t	SULFATE SULFUR %	PYRITIC SULFUR %	ORGANIC SULFUR %	PYRITIC SULFUR ACID BASE t/1000t	SULFUR ACID BASE POTENT. t/1000t
14-017-TP-1	<0.01	0	317	317	<0.01	0.01	0.01	0.31	317
14-017-TP-1	<0.01	0	321	321	<0.01	0.01	0.01	0.31	320
14-017-TP-2	0.03	0.94	288	287	<0.01	0.02	0.04	0.62	287
14-017-WR-1	1.01	31.6	53.9	22.3	0.05	0.59	0.37	18.4	35.4
14-017-WR-2	0.62	19.4	94	74.6	0.03	0.24	0.35	7.5	86.5

WATER MATRIX ANALYSES

Metals in Water   Results in ug/L

FIELD ID	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	HARDNESS CALC. (mg CaCO3/L)
14-017-SW-1	3.08 JX	115	2.57 U	9.7 U	6.83 U	1.7	475	0.2	6.6	12.7 U	2.62	30.7 UJ	17.5	103
14-017-SW-2	2.03 JX	114	2.57 U	9.7 U	6.83 U	2.57	1130	0.18	21.1	12.7 U	2.56	30.7 UJ	15.3	55.5

U - Not Detected; J - Estimated Quantity; X - Outlier for Accuracy or Precision; NR - Not Requested

Wet Chemistry   Results in mg/l

FIELD I.D.	TOTAL DISSOLVED SOLIDS	CHLORIDE	SULFATE	NO3/NO2-N	CYANIDE
14-017-SW-1	165	< 5.0	9	0.11	< 0.005
14-017-SW-2	128	< 5.0	5	< 0.05	0.008

LEGEND

SE1 - Downstream of lower tailings near Spotted Horse well.
SE2 - Upstream of pond created by waste rock dump 3 on Spotted Horse well.
TP1 - Composite of subsamples TP1A-A and 1B.
TP2 - Sample of subsample TP1A-B.
WR1 - Composite of subsamples WR1 and 2.
WR2 - Composite of subsamples 3A and 3B.
BACKGROUND - From the Tail Holt Mine (14-010-SS-1).

SW1 - Same as sample SE1.
SW2 - Same as sample SE2.

XRF ANALYSIS RESULTS

CUMBERLAND
PA NO. 14-017

Mine Name: Cumberland PA# 14-017
XRF Field Analyses
Results in PPM

XRF SAMPLE ID	CrHI	K	Ca	Ti	CrLO	Mn	Fe	Co	Cu	Zn	As	Sr
14-017-TP1A-A		23281.6	50741.1	509.323 *		537.31 *	11007.6			292.938	144.051	105.542
14-017-TP1A-B		21316.5	50977.8	726.312		1197.45	26414	475.612 *		1298.56	532.998	136.517
14-017-TP1-B		28986.7	68671.4	363.735 *		546.948 *	11114.6			418.814	161.268	128.837
14-017-TP-1-COMP		29747.5	64632.3	238.224 *		705.058 *	9925.16			360.166	179.732	117.393
14-017-WR3-B		4058.87	2794.58	2518.13			120780	1104.38 *		210.319	89.093 *	242.541
14-017-WR-1		17635.5	2371.17	396.486 *	151.76 *	11672.1	24603.1		68.2579 *	1607.74		161.42
14-017-WR-1-COMP		36304.1	15832.7	588.904 *	166.496 *	8830.3	21496.8			1355.25		203.38
14-017-WR-2		36285.5	13234.4	526.883 *		4097.78	15307.7		45.8146 *	801.792	46.9264 *	177.744
14-017-WR-2-COMP		6996.61	35111.7	1525.12		612.439 *	88937.7			179.618	140.758	169.038
14-017-WR-3A		12390 $	97069 $	695 $		844 $	11926 $			90 $	68 $	139 $

	Zr	Hg	Mo	Pb	Rb	Cd	Sb	Ba	Ag	U	Th
14-017-TP1A-A	57.3292			34.3286 *	116.52			362.493			8.25142 *
14-017-TP1A-B	92.9543			112.173	136.592		56.3367 *	485.75	121.925 *		14.6952 *
14-017-TP1-B	68.8006				207.45			449.04	82.085 *		
14-017-TP-1-COMP	67.2368			26.0509 *	165.407			372.989			12.181 *
14-017-WR3-B	492.8		11.4015 *	49.2448 *				1739.51			23.4445
14-017-WR-1	133.62		5.25657 *	2149.49	165.892			549.047			
14-017-WR-1-COMP	147.065			1392.05	259.363			963.278		15.3351 *	12.516 *
14-017-WR-2	116.994			334.387	256.872			980.389	77.711 *		11.3313 *
14-017-WR-2-COMP	302.267			76.4347 *	41.5018 *			1121.48		14.6948 *	12.8417 *
14-017-WR-3A	92 $			23 $	79 $			757 $			6 $

* – Estimated Quantity
$ – Unvalidated Data

ABANDONED AND INACTIVE MINES SCORING SYSTEM (AIMSS) SCORESHEET

CUMBERLAND
PA NO. 14-017

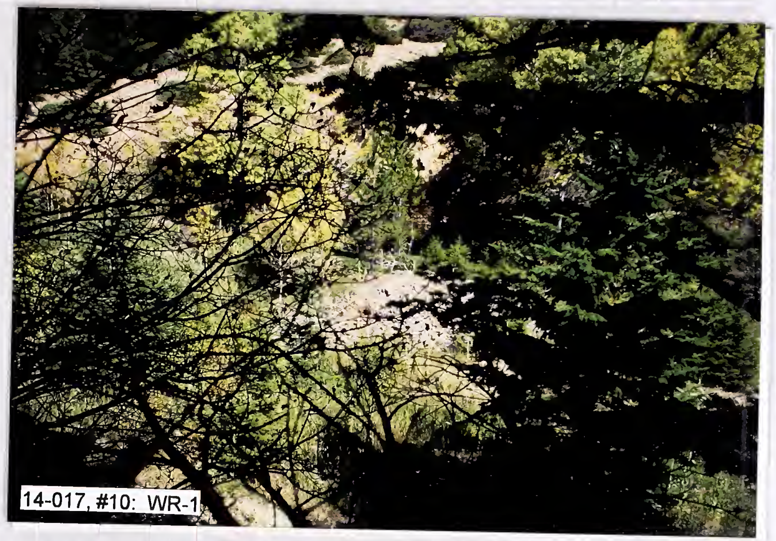
AIMSS SCORESHEET

SITE NAME: CUMBERLAND
PA NUMBER: 14-017

LINE NO.				
		GROUNDWATER PATHWAY		
1	GW - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
2		EXCEEDENCES		0
3A		CONTAINMENT		20
3B		GW DEPTH		10
3C		POTENTIAL TO RELEASE	LINES 3A x 3B	200
4		LIKELIHOOD SCORE	LINES 1 + 2 + 3C	200
5	GW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	1.544
6	GW - TARGETS	WELLS - 1 MI. x 2.5		12.5
7		WELLS - 1 TO 4 MI		23
8		NEAREST WELL		5
9		TARGETS SCORE	LINES 6 + 7 + 8	40.5
10		**GROUNDWATER SCORE**	LINES 4 x 5 x 9	12506
		SURFACE WATER PATHWAY		
11	SW - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		300
12		EXCEEDENCES		0
13A		CONTAINMENT		20
13B		DISTANCE TO SW		20
13C		POTENTIAL TO RELEASE	LINES 13A x 13B	400
14		LIKELIHOOD SCORE	LINES 11 + 12 + 13C	700
15	SW - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	1.721
16	SW - TARGETS	DRINKING WATER POP'N		0
17		IMPACTED DRAINAGE		0
18		WETLANDS		10
19		FISHERY		0
20		RECREATION		0
21		IRRIGATION/STOCK		2
22		T & E SPECIES HABITAT		0
23		TARGETS SCORE	SUM LINES 16 - 22	12
24		**SURFACE WATER SCORE**	LINES 14 x 15 x 23	14456
		AIR PATHWAY		
25	AIR - LIKELIHOOD OF RELEASE	OBSERVED RELEASE		0
26A		CONTAINMENT		1
26B		DISTANCE TO POPULATION		10
26C		POTENTIAL TO RELEASE	LINES 26A x 26B	10
27		LIKELIHOOD SCORE	LINES 25 + 26C	10
28	AIR - WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.030
29	AIR - TARGETS	POPULATION - 4 MILES		30
30		NEAREST RESIDENCE		5
31		WETLANDS		0
32		PARKS / WILDERNESS		0
33		T & E SPECIES HABITAT		0
34		TARGETS SCORE	SUM LINES 29 - 33	35
35		**AIR PATHWAY SCORE**	LINES 27 x 28 x 34	11
		DIRECT CONTACT PATHWAY		
36	LIKELIHOOD OF EXPOSURE	OBSERVED EXPOSURE		50
37A		ACCESSIBILITY		10
37B		DISTANCE TO POPULATION		10
37C		POTENTIAL EXPOSURE	LINES 37A x 37B	100
38		LIKELIHOOD SCORE	LINES 36 + 37C	150
39	D. C. WASTE CHAR.	CALCULATED SCORE	(SEE WORKSHEET)	0.027
40	DIRECT CONTACT TARGETS	POPULATION - 1 MILE		10
41		NEAREST RESIDENCE		5
42		RECREATIONAL USE		5
43		TARGETS SCORE	SUM LINES 40 - 42	20
44		**DIRECT CONTACT SCORE**	LINES 38 x 39 x 43	81
45	**TOTAL SITE HUMAN & ENVIRONMENTAL HAZARD SCORE** (LINES 10 + 24 + 35 + 44) / 100,000			**0.27**

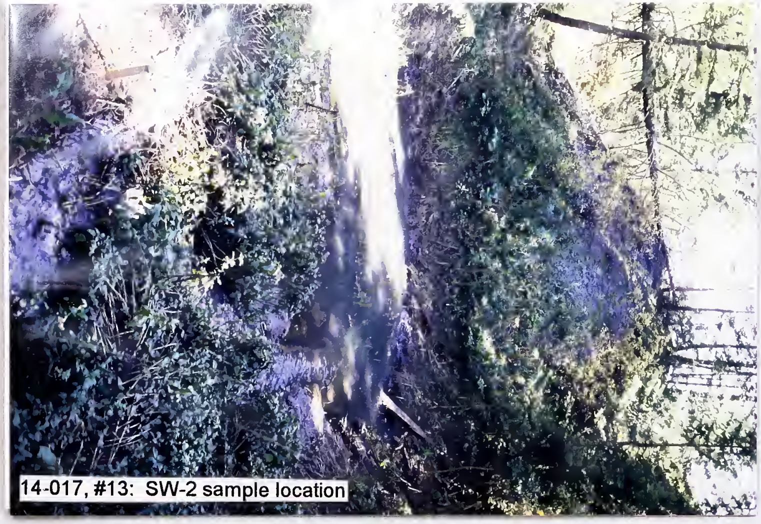
LINE NO.		SITE SAFETY		SITE NAME: CUMBERLAND PA NUMBER: 14-017
1	THREAT	ACCESSIBILITY		10
2		OPEN SHAFTS	100 EA.	0
3		OPEN ADITS	50 EA.	100
4	HAZARDS	UNSTAB. HIWALLS / PITS	75 EA.	75
5		HAZ. STRUCTURES	40 EA.	0
6		EXPLOSIVES		0
7		HAZ. MATERIALS		0
8		HAZARDS SCORE	SUM LINES 2 - 7	175
9		POPULATION - 1 MILE		10
10	TARGETS	NEAREST RESIDENCE		5
11		RECREATIONAL USE		5
12		TARGETS SCORE	SUM LINES 9 - 11	20
13		**SITE SAFETY SCORE**	(LINES 1 x 8 x 12) / 1,000	**35.00**

14-017, #9: SW-1 sample location

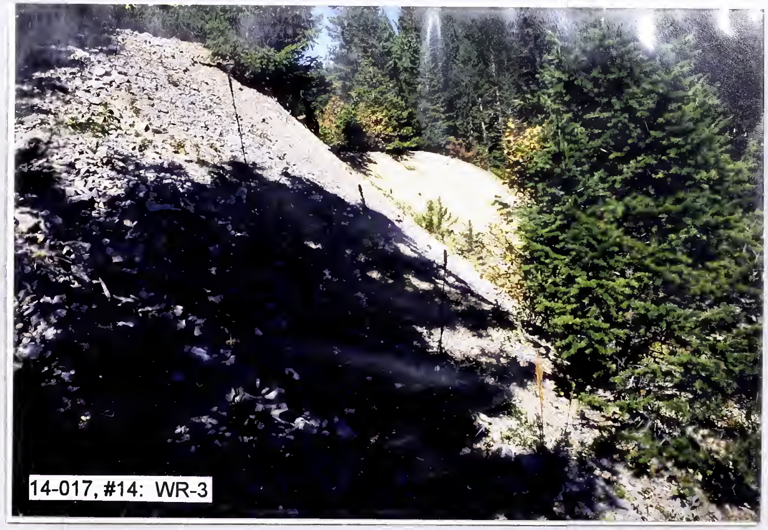

14-017, #10: WR-1

14-017, #11: WR-2

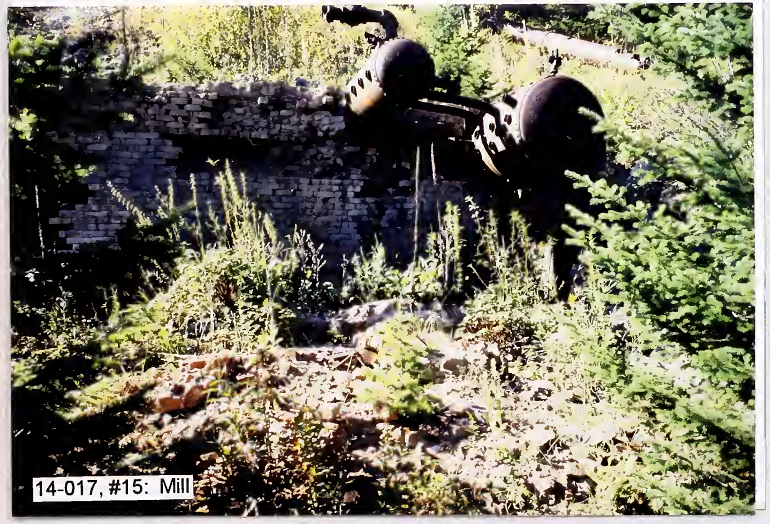
14-017, #12: Glory hole



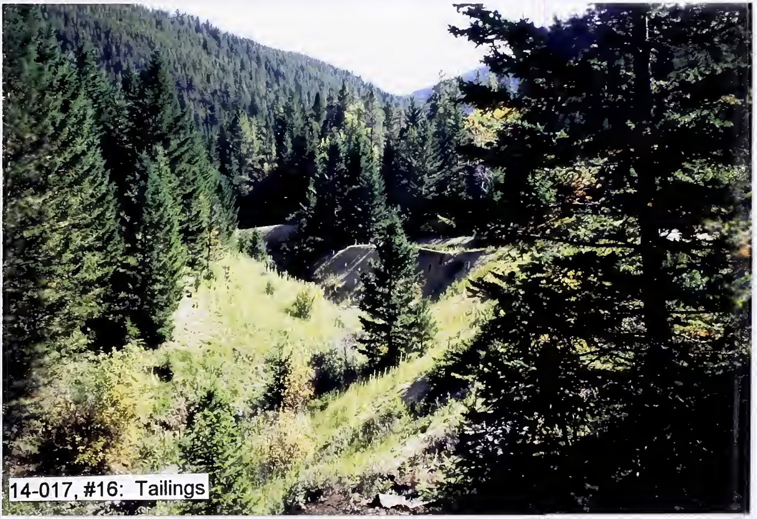
14-017, #13: SW-2 sample location



14-017, #14: WR-3



14-017, #15: Mill



14-017, #16: Tailings